

JANUARY 1961

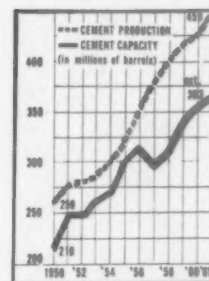
ROCK

PRODUCTS

FORECAST FOR 1961 page 84

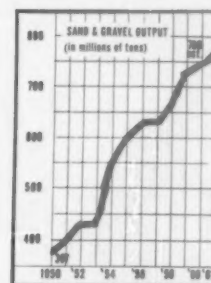
Cement...

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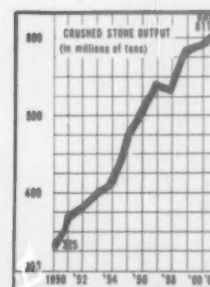
Sand & Gravel...

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Crushed Stone...

page 94



Promotion solves rock dilemma page 100

Higher output on FINE GRINDING ..20 to 400 mesh.. with WILLIAMS ROLLER MILLS

A Williams does the entire job in a single continuous operation—from feed through grinding, blending, drying and classifying!

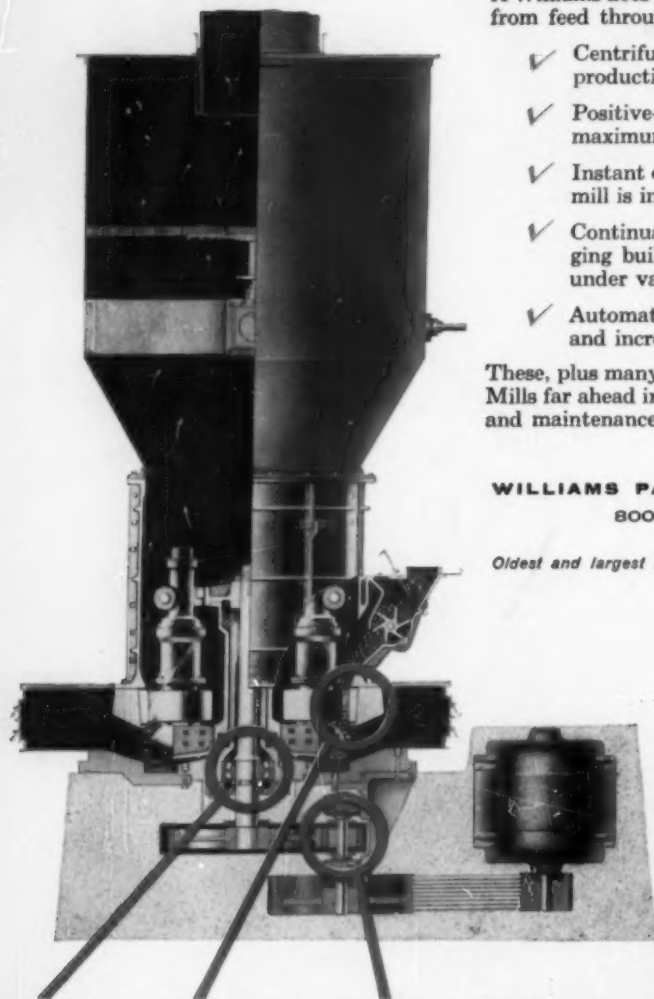
- ✓ Centrifugal grinding roll action against bull ring keeps production high—automatically compensates for wear
- ✓ Positive-flow feed control is self-adjusting—maintains maximum capacity of mill
- ✓ Instant external fineness adjustment can be made while mill is in motion
- ✓ Continual upward air sweep to classifier prevents clogging build-up of finely ground material. Mill operates under vacuum to insure dustless operation.
- ✓ Automatically controlled hot air is available for drying and increased output of moist material.

These, plus many other advanced features keep Williams Roller Mills far ahead in higher production, lower costs, less downtime and maintenance. Write for catalog.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 St. Louis Ave. • St. Louis 6, Mo.

Oldest and largest manufacturers of hammer mills in the world



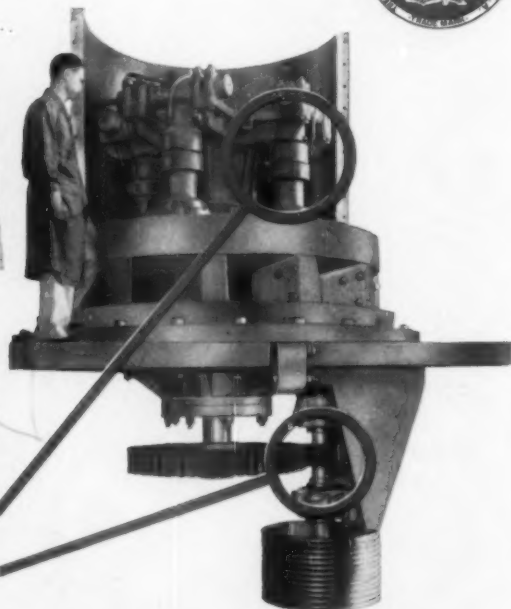
Troublesome alignment is greatly simplified and far less frequent with only 2 bearings on main shaft; the bottom one carrying both radial and thrust loads.

From here, material pulverized by rollers against bull ring are air-lifted to classifier which passes correctly sized product and returns coarse material for regrinding.

Exclusive! Only Williams has longer-life SPUR GEAR or GEARLESS DRIVES that eliminate expensive bevel and other hard-to-maintain gears. Standard and larger models have rugged spur gear and pinion drive—smaller models have direct motor-to-shaft V-belt drive requiring no care or lubrication.

"Giant" mill with cover section off show roller journals which suspend grinding rolls on bearings sealed against dirt and grit. Note wear-resistant steel forged bull ring.

Housing is also removed to show rugged spur gear and pinion drive. Easy, quick accessibility for service is another Williams time and money-saving feature.



WILLIAMS
CRUSHERS GRINDERS SHREDDERS



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NEW Link-Belt bucket elevator chain developed for high elevators handling abrasive materials

Elevators in cement mills and similar installations handling abrasive materials benefit from the long service life of these durable SS Class bushed chains

SS-2857: 6" pitch; 130,000# chain

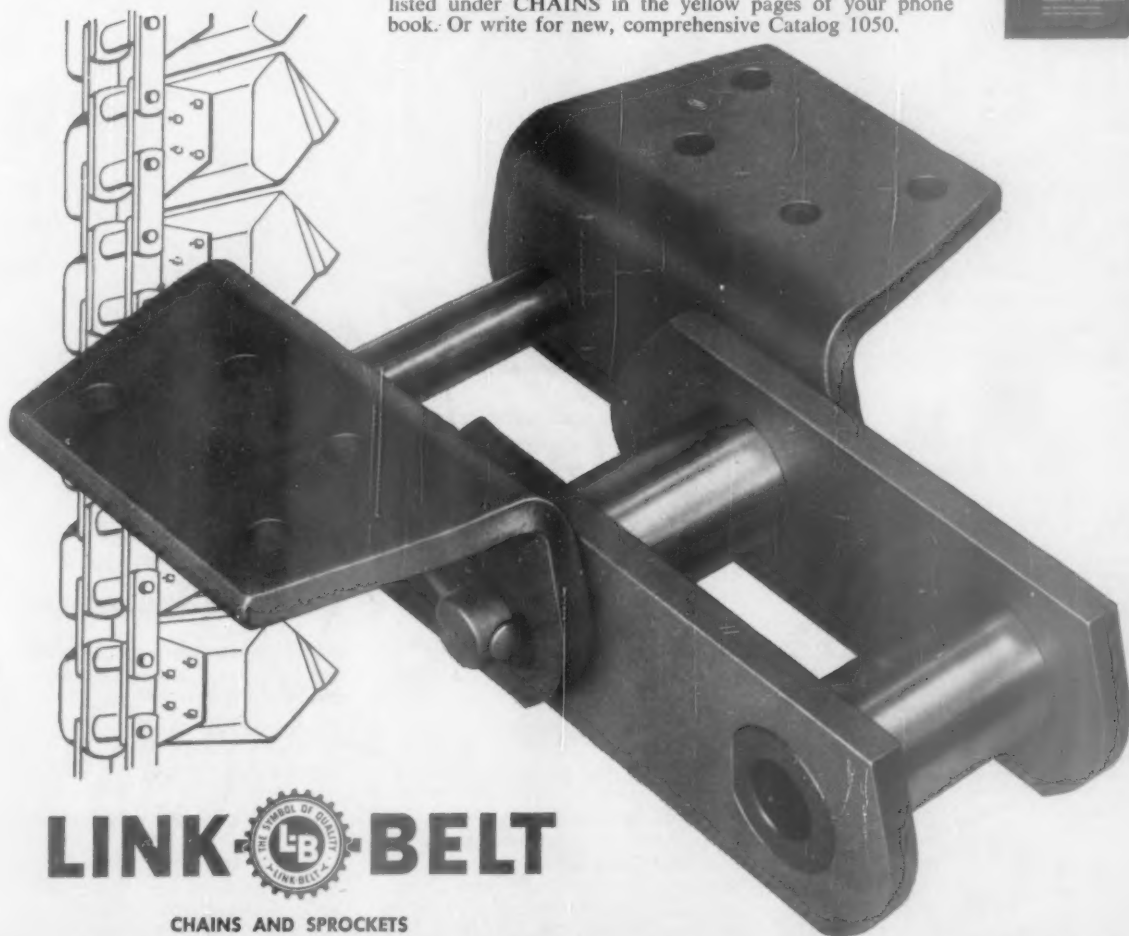
SS-2859: 6" pitch; 200,000# chain

SS-2864: 7" pitch; 200,000# chain

The punishing effects of heavy loads and severe abrasives are easily absorbed by the three new Link-Belt elevator chains listed at the left. The chains are capable of uninterrupted service day-in and day-out—even on high, heavily loaded elevators—because of their balanced design and high strength.

Hardened steel sidebars are machined for accurate, uniform pitch. Alloy steel pins are specially heat-treated to combine toughness and wear resistance without sacrifice of shear strength. Alloy steel bushings are case-hardened to resist wear and sprocket impact.

For full details on these rugged elevator chains, or other Link-Belt SS Class chains for lighter service, call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for new, comprehensive Catalog 1050.



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CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,342

ROCK PRODUCTS, January, 1961

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1

ROCK

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Rubber belt refuses to crack when the heat's on

Handles hot cargo that baked, hardened and broke other belts

THAT's crushed limestone, still sizzling hot from the kiln, being taken to a discharge bin via conveyor belt. The conveyor operates 18 hours a day. But keeping it going used to be costly. The 200 degree heat baked rubber belts, soon they'd crack and break. Average belt life was only 5 or 6 months.

Then a B.F. Goodrich distributor recommended a new kind of conveyor belt, called Solarflex, designed specifically for handling hot materials. This belt is made of a special rubber that stays soft and pliable at temperatures that cause other belts to harden, crack and finally break down.

After 32 months on this job, the improved B.F. Goodrich hot-material belt shows no sign of wear, looks like it will be good for years to come. The limestone company has three other BFG Solarflex belts handling finished lime at even higher temperatures. And they, too, are standing the heat far better than any belts used previously.

When you call on a B.F. Goodrich distributor for help with a conveying problem, you can count on getting the kind of belting that will keep things in your plant moving, cut down on repairs, and give you more for your money in terms of long, useful service.

BFG distributors have full information on this hot-material belt. And, as factory-trained specialists in rubber products, they can answer questions about the many products B.F. Goodrich makes for industry. *B.F. Goodrich Industrial Products Co., Department M-948, Akron 18, Ohio.*

B.F. Goodrich
CONVEYOR BELTS

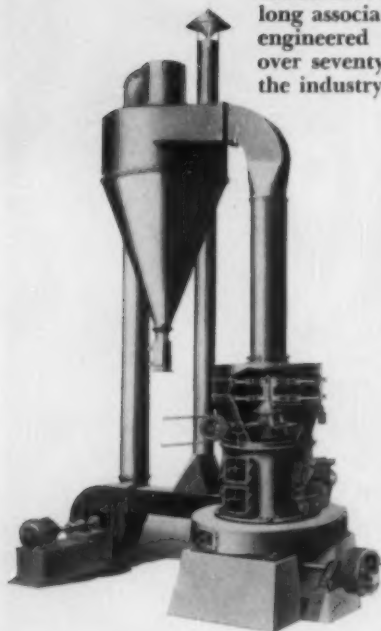
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Raymond

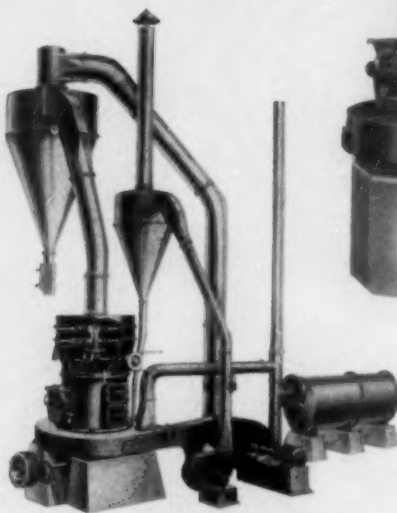
HIGH SIDE ROLLER MILLS

TODAY'S ECONOMY UNITS FOR FINE GRINDING OPERATIONS

ROLLER MILL ECONOMY is an accepted term long associated with the Raymond line of finely engineered roller mill equipment, developed over seventy years ago, and known throughout the industry for its traditional record of service.



STANDARD ROLLER MILL with Whizzer Air Separation. Provides instant fineness control over a wide range by one simple adjustment, and maintains consistent uniformity of product.



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- (3) Large rugged bearings, heavy over-size shafts, finely balanced construction and grinding elements made with specially hardened wearing surfaces, all contribute to long service-life and low-cost performance.



For general information on Raymond Roller Mills refer to Catalog Number 79 R.

For specific details on the Super Roller Mills write for Bulletin Number 72 R.

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at
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A policy of working toward keeping their customers in business has been largely responsible for the rapid growth of Riddle Quarries, Inc. with headquarters at Salina, Kansas.

Riddle Quarries, Inc. operates in 21 counties in Kansas and three more locations are being considered. The management believes in *keeping modern*.

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CONVEYOR BELTING



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Idler questions? H-R has the answers!

At last! A truly comprehensive book on belt conveyor idlers that answers *all* your questions. The new Hewitt-Robins "Belt Conveyor Idlers" book is one of the most complete ever offered to industry. In it you'll find:

- More than 80 helpful graphs, sketches, tables, charts; 150 illustrations; 48 pages of detailed information you can use.
- Engineering information on belt speeds, conveyor capacities, idlerspacing, and other factors you must consider in selecting idlers.
- Comparison of ten competitive idler designs.
- Complete explanation of 14 basic types of idlers manufactured by H-R to fit every belt conveyor need.
- Answers to questions frequently asked about idlers.
- Tips on how to extend the life of idlers.

For your copy, consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 1-19.



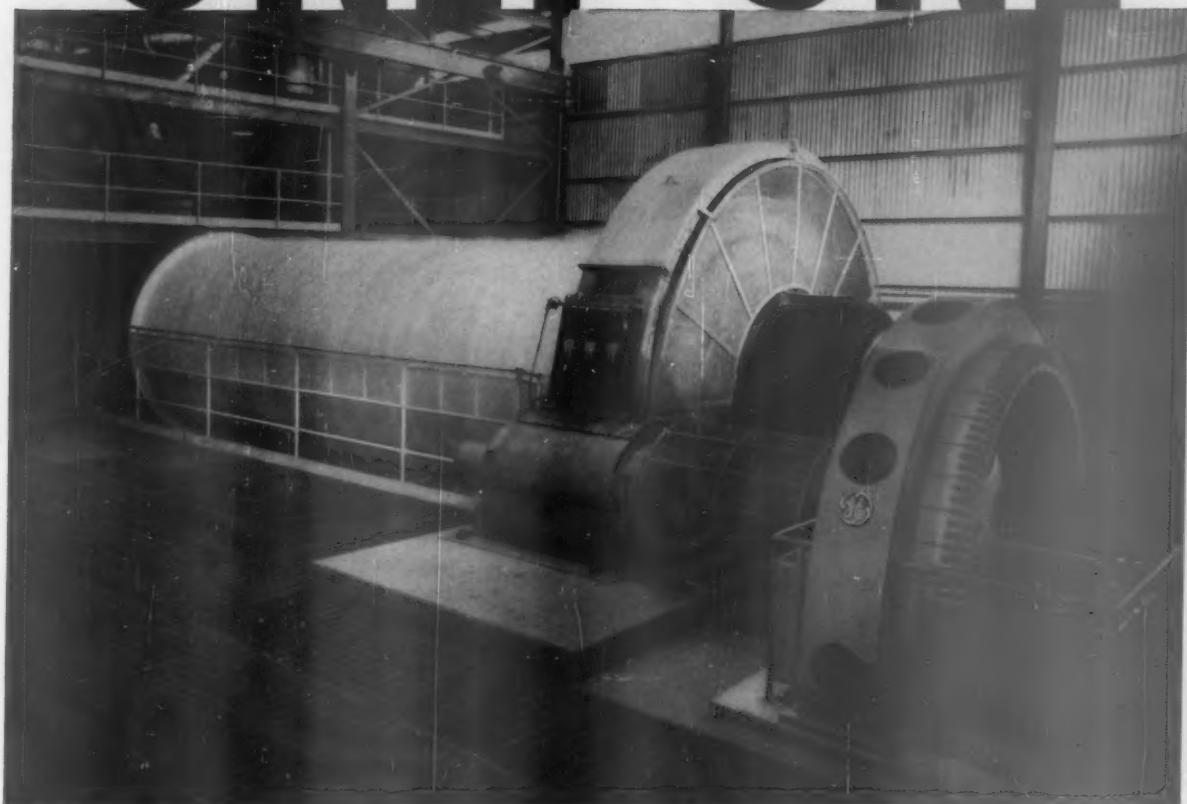
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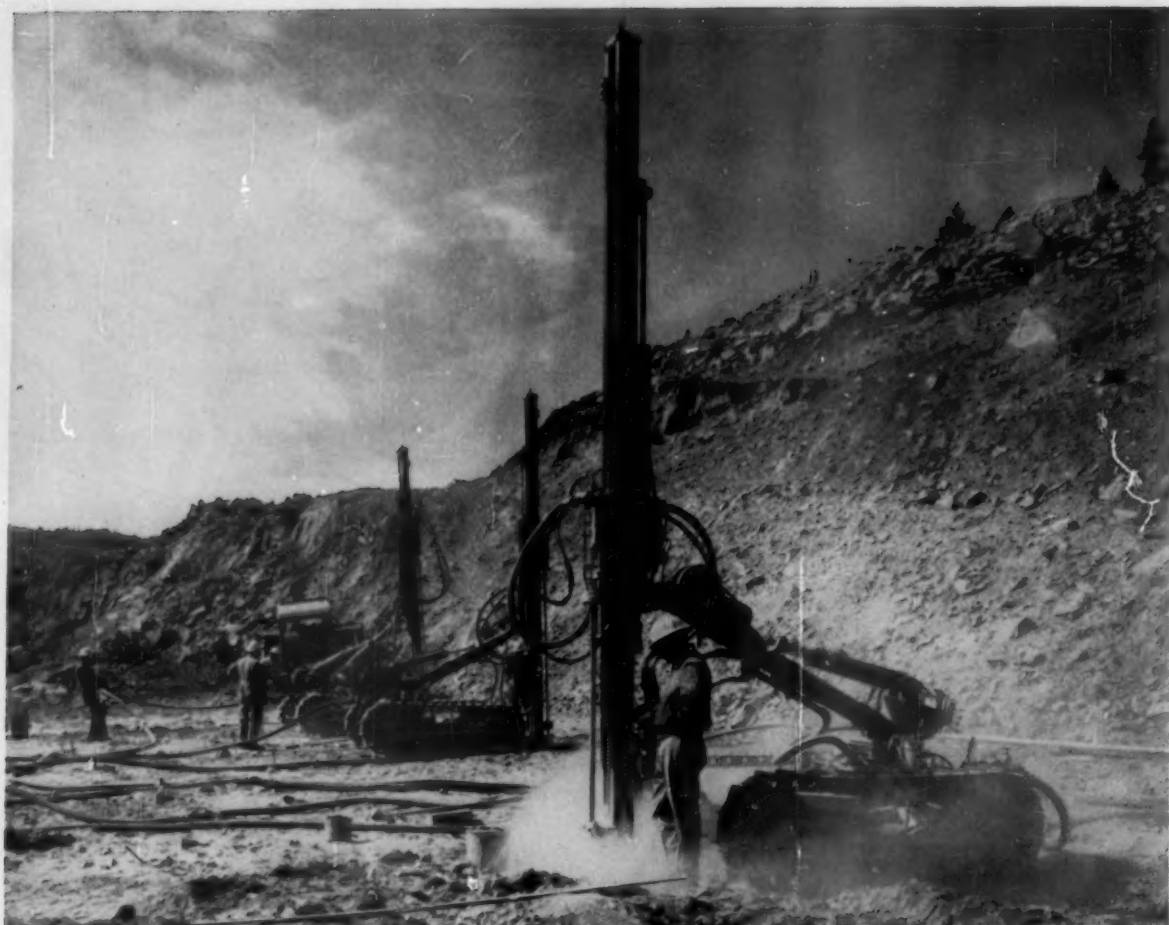


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ABOVE: G-900 TRACDRILLS with "Hydra-poise" knee-action have unmatched maneuverability and stability to sink blast holes in any formation. Independently operated, extra-long crawlers provide 1350 square inches of ground contact. Two sets of grouped controls—one at turret, the other at boom end—save time and steps for driller.

BELOW: A battery of "POWER VANE" ROTARY COMPRESSORS, supplies air to a group of G-900 Tracdrills on a big project. Used singly or in batteries, "Power Vane" Rotaries have the "Go-Power" you need to keep your air-powered equipment producing at full capacity.



G-900 TRACDRILLS

are at their best in the toughest terrains and formations

...let their power and stamina deliver more blast holes per shift for you! Mention treacherous footing and hard rock and you've got a job for Chicago Pneumatic G-900 Tracdrills and "Power Vane" Rotary Compressors.

Operators find the new G-900 a mining man's drill. It's got everything a driller expects from a high production rig... plus some real exclusives, too! It can drill directly alongside tracks with 180° full boom swing. It handles horizontals 11 feet high at the face, or snake holes at ground level. And you can't beat the G-900 for safety. Release the throttle and heavy-duty brakes lock automatically... keep drill from shifting or creeping... hold hard on really bad ground.

Backed up by rugged, always reliable CP-600 "Power Vane" Rotary Compressors with the "Go-Power" to meet every air demand, you can lick the toughest formations you'll ever find. Write for your copy of the new bulletin SP-3267 on the revolutionary G-900 Tracdrill. Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.

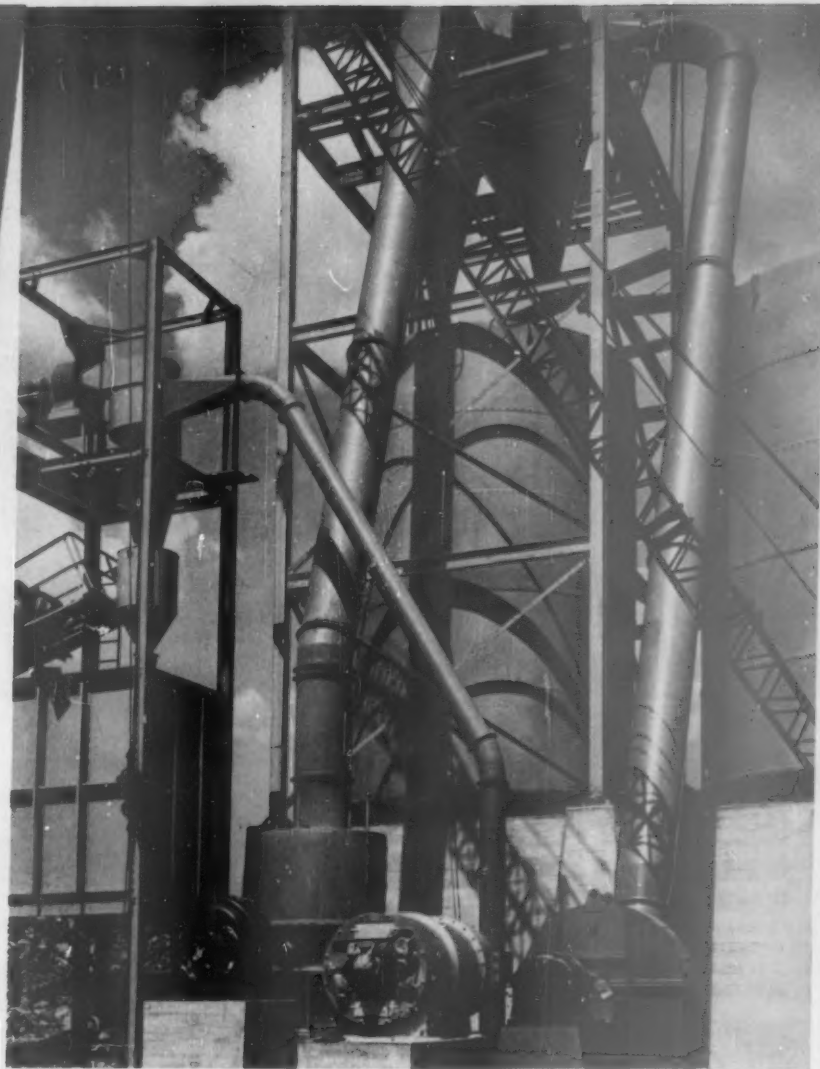


Chicago Pneumatic

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 Mill to Cyclone Collectors
 Cyclone Collectors to Fan
 Vent to Secondary Collectors
 by Buell Engineering Co., Inc.
 Northern Blower Division



22 TONS-PER-HOUR AG-LIME AT 98% PASSING 20 MESH

Typical of Bradley work in the grinding field is this Pneumatic Hercules Mill installation at the Pine Creek Plant of Lyscoming Silica Sand Company, Montoursville, Pa.

The installation takes Limestone of 2" maximum down to dust and containing, at times, as high as 10 to 12% moisture. The Bradley Mill System produces from this feed 22 tons-per-hour of finished material, with a fineness of 98.5% minus 20 mesh,

72 to 75% minus 100 mesh, containing approximately 1% moisture.

Bradley manufactures a full range of Pneumatic Mills with or without Flash Drying for finenesses up to 325 mesh... plus Bradley Hercules Screen-Type Mills to handle your semi-fine pulverizing requirements.

Bradley will test-grind your materials in their grinding facilities at Allentown, Pa. *without cost.* Write for details.

See Chemical Engineering Catalog or write for Bradley Catalog No. 63

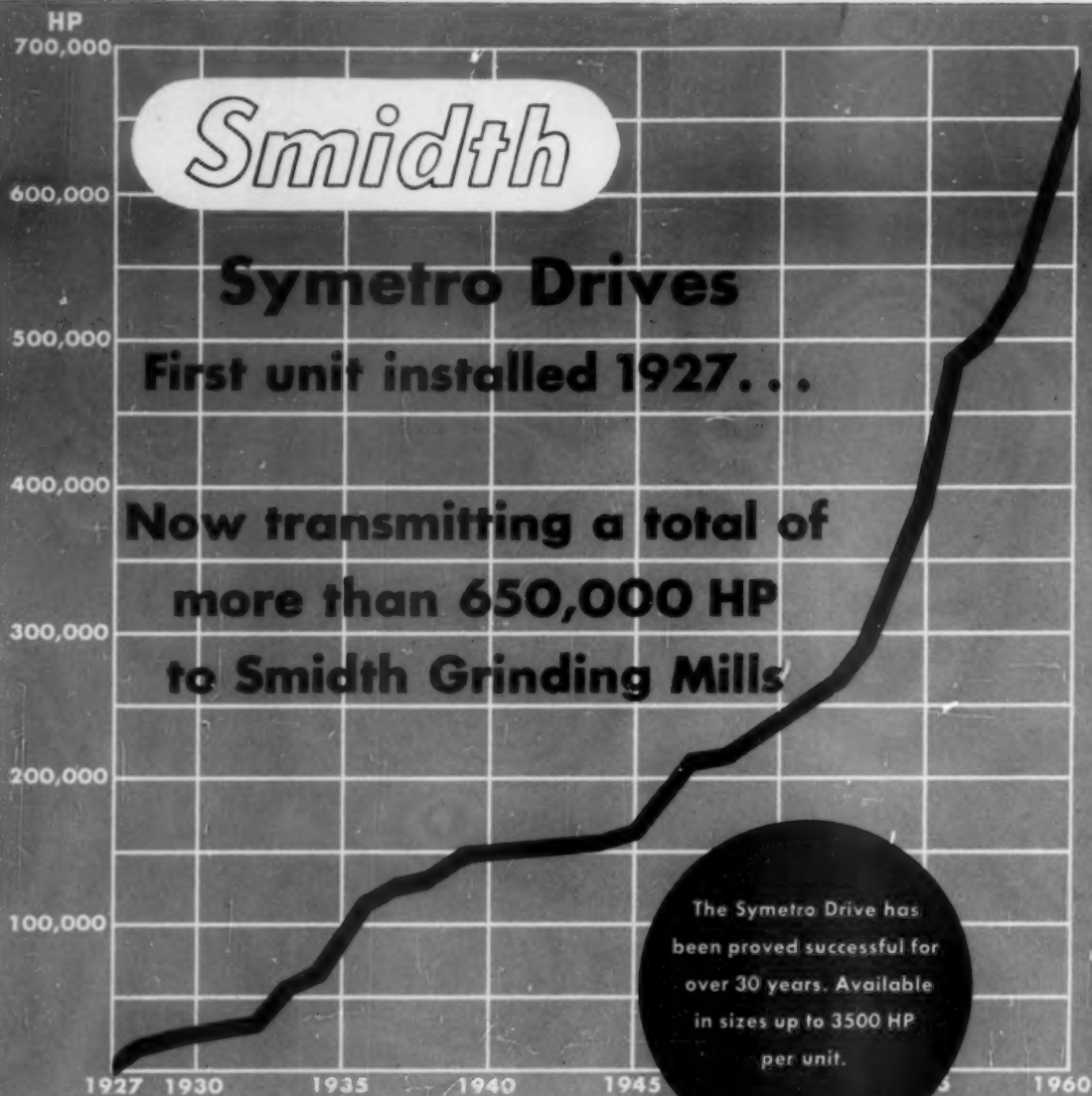


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PULVERIZER COMPANY

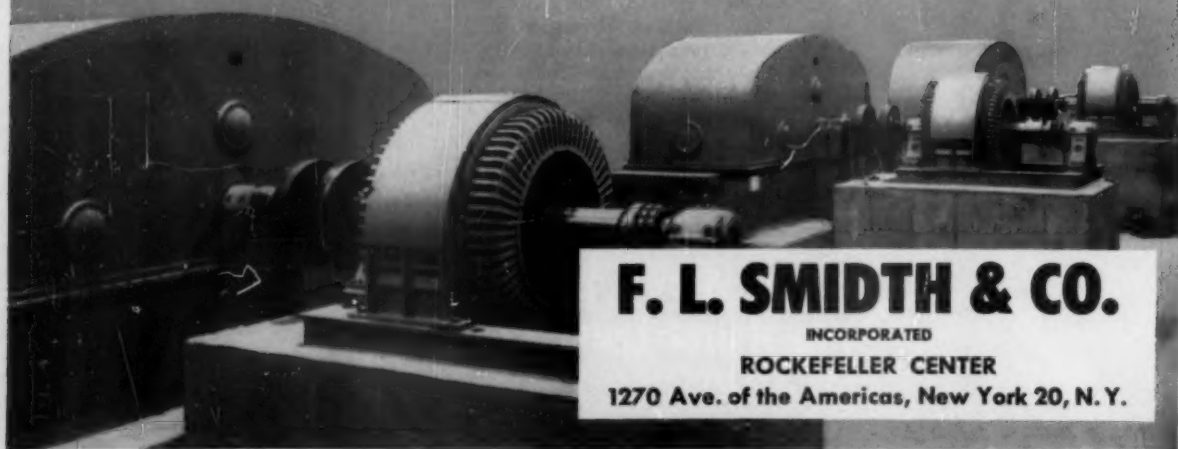
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**GRAPH SHOWING HP OF SMIDTH
SYMETRO DRIVES SOLD FROM 1927 TO 1960**



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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

Optimism on the construction front was noted toward the close of 1960. The Commerce Dept. said that moderate expansion in private residential building activities was a factor in a contra-seasonal rise in the industry. Construction outlays in November accelerated to a seasonally adjusted annual rate of \$55.3 billion, 1 percent ahead of the October pace. Spending for public works projects also increased slightly during the month, with highway expenditures up to an adjusted annual rate of \$6.1 billion from \$5.7 billion the previous month.

Russian chemists have developed a concrete that uses cotton wastes as a substitute for cement. Despite the fact that cement is both cheap and readily available in the Soviet Union, the scientists report other advantages. It is said, for instance, to be as much as seven times stronger than conventional cement-based concretes.

The Keystone Dam is a real cool project, says the Corps of Army Engineers of the Tulsa (Okla.) district. They're refrigerating the aggregates in the cement for the 4,570-ft. structure that will rise 121 ft. from the bed of the Arkansas River. An elaborate vacuum system features 70-ft. steel tubes—three for rock and two for sand—that cool the materials to about 40 deg. F. before they are conveyed to the concrete mixing plant. This is expected to overcome the heat generated by hydration, thus lessening the possibility of cracking during the concrete's "shrinking" period after it is poured. Some 750,000 cu. yd. of concrete will go into the dam.

Exhaustive research into anti-smog devices by the California smog board may eventually affect every car and truck owner in the nation. Two main types are being developed: a "direct-flame" afterburner and a catalytic converter. Both resemble and replace the muffler on a car and are fastened to the exhaust pipe. The chief engineering problem is to burn up exhaust fumes, now contributing 96 percent of the carbon monoxide, 71 percent of the hydrocarbons and 60 percent of the nitrogen oxides to the noxious nuisance. Costs are high. Afterburners are made of heat-resistant steel or ceramics and converters use pellets of platinum at \$90 to \$150 per ounce. If they become mandatory in the state (which is expected), and the devices prove effective in reducing smog, they will undoubtedly be required in the estimated 9,500 other cities in the U. S. that have air-pollution problems.

Classes will go underground in a school to be built in Artesia, N.M. The 18-in. concrete roof covering, flush with the ground, will be useful as a basketball court. This new concept in school buildings is expected to serve two purposes—for classes and as a shelter against radioactive fallout in event of attack. A grant from the Office of Civil and Defense Mobilization will help with construction costs.

A wavelength of light has become the new international standard of length.

Announcement that it would replace the meter bar used as the standard for more than 70 years came from Dr. Allen V. Actin, director of the National Bureau of Standards, U. S. Department of Commerce. The action was effected by the 11th General Conference on Weights & Measures during its meeting in Paris, France. The new definition of the meter will not materially affect the measurement of length—the inch now equals 41,929.399 wavelengths of krypton light—nor will it change in any way the relation between the English and Metric units. What's more, the new definition brings the standard of length used by spectroscopists for the past 50 years into agreement with that used by other branches of science, thus increasing the unification of systems of measurement throughout the world.

What's eating the sulphur in coal may reduce unpleasant odors from industrial and power-plant smokestacks, according to a report from the Bureau of Mines researchers. They have discovered that certain bacteria—ferrobacillus ferrooxidans—mixed with pulverized coal and acidified water, can remove up to 65 percent of the pyrite sulphur from coal after a 72-hr. incubation. Different coals are now being screened to determine the practicality of using the process on a large scale.

New metal-bonded graphite has been developed by the scientific laboratory of Ford Motor Co. Members attending a meeting of the American Institute of Mining, Metallurgical & Petroleum Engineers were told that the process uses powder metallurgy to beat the poor-strength bugaboo shown by previous metal-graphite combinations. Powdered calcium-silicon alloy is added during the liquid phase sintering. The new material, now being tested in bearings and other motor parts, can contain from 40 to 90 percent graphite with iron or any of several metals including nickel, cobalt, copper, silver and aluminum.

New rock salt deposits have been discovered in the Cheshire Basin and North Shropshire in northwest England. The Geological Survey of Great Britain estimates the find at 400 billion tons. A borehole over 5,500 ft. deep proved an upper saliferous group (rock salt with subordinate beds of marl) 1,327 ft. thick and a lower group 625 ft. thick. More than 1,000 ft. of marl lies between them. The upper salt group extends some 400 sq. miles beneath the Cheshire Basin; the lower group, 170 sq. miles. Saliferous beds of both groups have further undefined extensions southward.

Since the increase in freight rates authorized by the Interstate Commerce Commission last October, railroads have noted a flagging traffic. They had estimated the increase at 1.7 percent, yielding approximately \$147 million additional revenue annually. One line—the St. Louis-San Francisco Railway—commented that the result was "certainly disappointing." The tapering off of construction, due to colder weather and the uncertain economy, slowed traffic far behind the strike-dented pace of a year ago. According to the New York Central, shipments of building materials are 18 percent below 1959. A traffic official of the Chesapeake & Ohio Railway said that loading in the fall months of such materials as sand, stone, lumber and cement were 5 percent under the previous year. Shipper groups profess more optimism about the future, but rail men contend that the 13 regional shipper advisory boards are "generally on the high side" in forecasts.

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EDITORIAL

by GEORGE C. LINDSAY

1961 — Year of Opportunity

THE YEAR 1961 will be one of opportunity for producers in the rock products industry who face successfully the industry's biggest problem: high costs. Although prospects are good for increasing markets for the year, those who do not make satisfactory gains in productivity rates and don't show improvement in general cost reduction may find they are operating marginal properties. Some even may go out of business.

Some segments of the rock products industry began to complain about high costs a few years ago. Voices of protest against the demon increased steadily year by year, until today nearly everyone has joined the chorus. The ROCK PRODUCTS forecast for 1961 (see pp. 84-95) reveals that the problem's getting worse. High costs are to be the biggest and most distasteful problem to be solved this year—in every segment of the industry.

That the problem has become almost universal would indicate that the industry as a whole has had little success in finding an answer up to now. You know, as well as we do, that it's imperative that one be forthcoming—and soon.

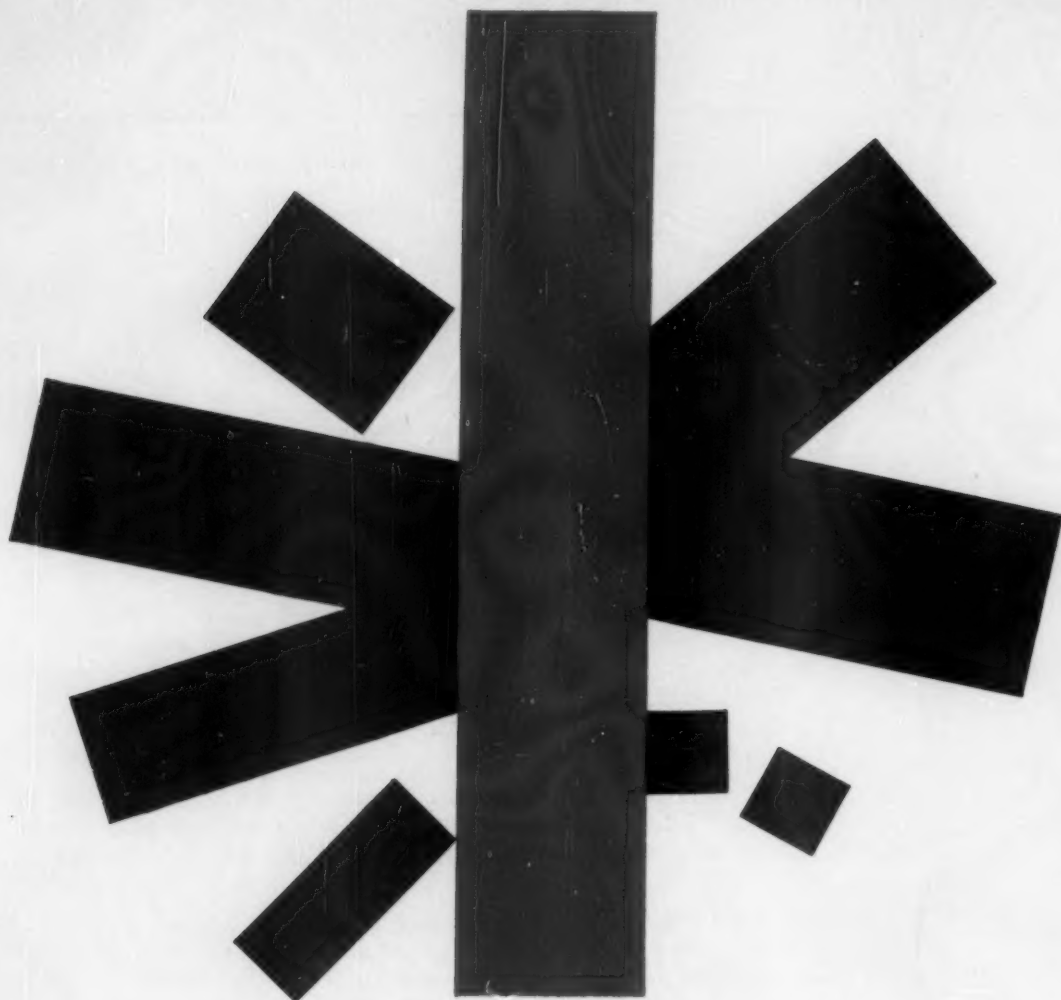
Fortunately for them, some individual producers have been working for years to keep down their unit cost of production. They've been successful because they recognized the problem and met it. We've been proud to report their successes through our pages month after month.

It's been our hope that others would take advantage of the experiences of the efficient operators, for general industry improvement. They've been kind enough to pass along to us the information, which we've passed along to you. Can you afford not to listen to their successes—when some of you face disaster, as you report, or at least a hard time to make ends meet this year?

It isn't enough just to plunk down a \$3-bill every year for our magazine; you've got to get on the inside and pour over every scrap of information in every issue to find that which will help you. We try our level best to make this as easy for you as possible.

Sure, there are other good sources of help for you—association meetings, equipment manufacturers, your friends in industry, and many others. We can't print everything, even though sometimes we think we do. But we can get good, helpful material to you regularly, delivered right to your desk.

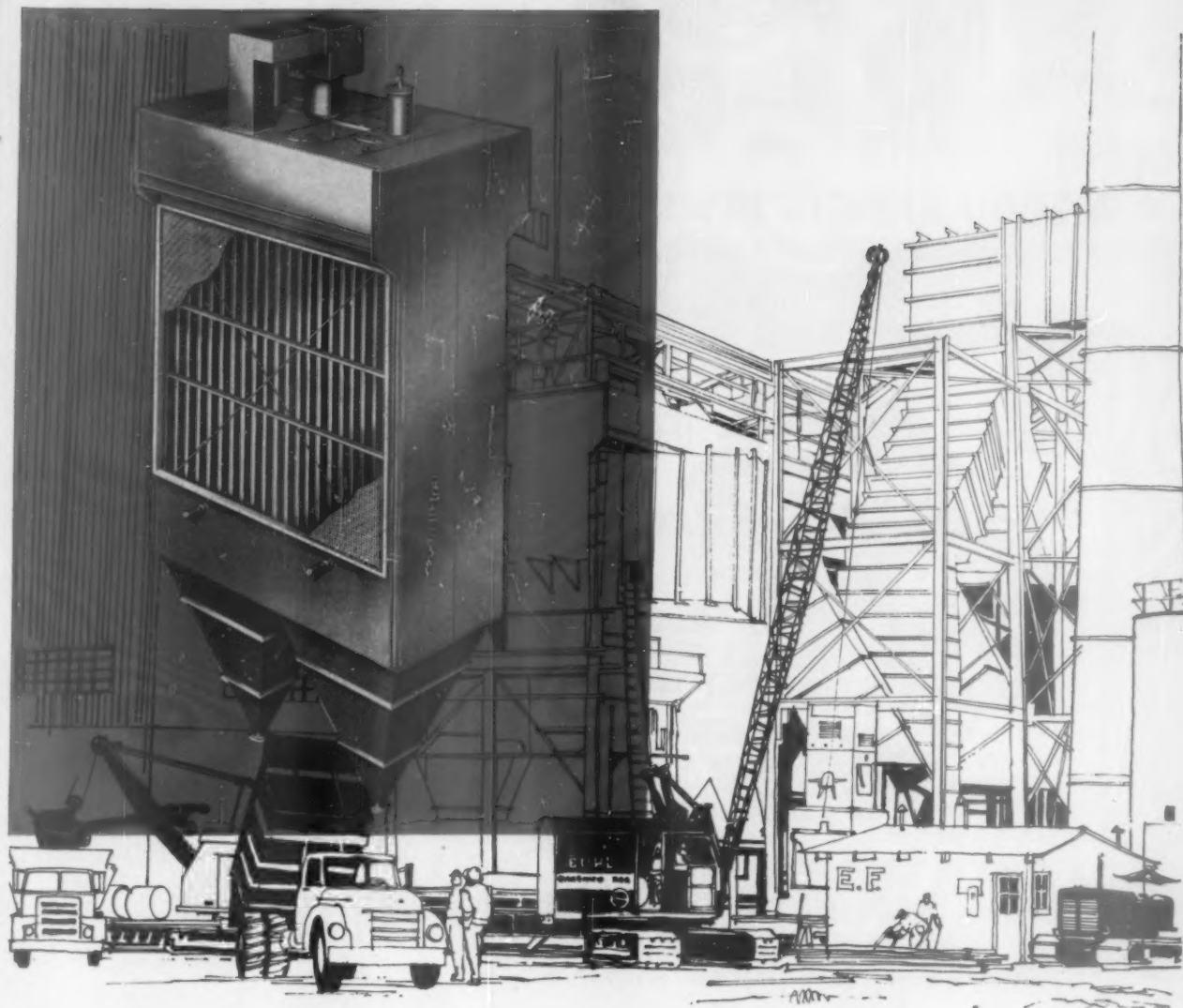
Whatever you do, use every available source of information to get your big 1961 problem solved. It's really your year of opportunity.



**Improved collector plate
design, factory pre-assembly
that cuts field erection time,
Improved pneumatic or
electric rapping, automatic
voltage control, choice of
high-voltage rectifiers**

This is the new electrostatic

One of the most important features of our new electrostatic precipitator is the unique new collector plate. It is a flat plate to which we have added a "pocket" that traps dust, and reduces the chance of reentrainment. The new design also improves clean-plate sparking voltage, increases the migration velocity of particles, performs better with high



precipitator from American-Standard Industrial Division!

resistivity dusts, and makes rapping much easier. The choice of rapper is up to you; we offer both pneumatic and electric types. So is the choice of rectifier... silicon, selenium, high-voltage vacuum, or mechanical. Automatic voltage control is standard with all units. Factory pre-assembly is carried to the limit of practicality. Case in point: Structural frames,

side casing, end panels, and hoppers arrive ready to drop in place. The result is faster, less costly field erection. For detailed information, call our nearest sales office and talk with one of our product specialists. American-Standard Industrial Division, Detroit 32, Mich. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

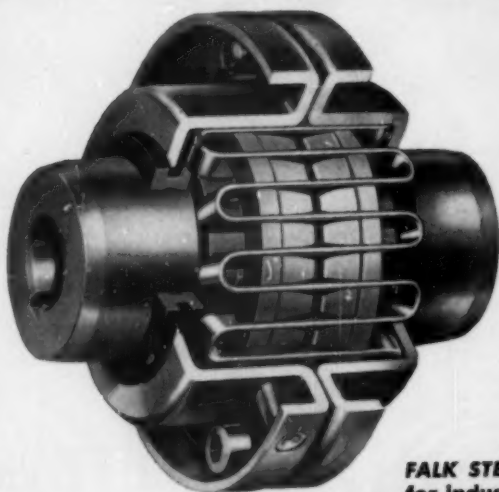


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for industrial applications...large or small

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On a blooming mill at the Copperweld Steel Company plant in Warren, Ohio, installation of a large Falk Steelflex coupling between motor and pinion stand eliminated troublesome noise and vibration which threatened to damage mill machinery. Transmitting 5,000 hp at 50/100 rpm, this is not the largest Falk coupling... others are designed to transmit up to 130,000 hp at 100 rpm.

This installation and others like it prove the Falk concept of shaft coupling design—namely, a modern shaft coupling must contribute to the successful performance of the machinery system.

What does this mean to you? Just this: On large machines as well as small, the exclusive Falk grid-groove design does make a difference, and the difference is torsional resiliency with the strength of steel...reason enough to specify Falk Steelflex couplings as "long life" insurance for your connected machinery.

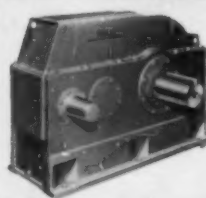
Falk Steelflex couplings are available in standard designs in 34 sizes for applications from .3 hp at 100 rpm to 130,000 hp at 100 rpm, with excellent delivery. Write for Bulletin 4100.

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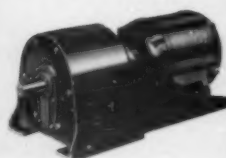
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ROCKY'S NOTES

by NATHAN C. ROCKWOOD



Introduction to materials science

MUCH HAS BEEN SAID AND WRITTEN LATELY about "materials science." Members of such organizations as the American Society for Testing Materials, for example, are beginning to recognize that there is much more to a useful knowledge of materials than tests for determining strength and durability. They are even now searching for a name for the society that will be more comprehensive. Yet, a great many of us, who have been familiar with ASTM and its work for many years, are none too familiar with what the term "materials science" means.

As readers of this page must know, we have been scouting around in new scientific literature, as it becomes available, in search of a textbook that would be helpful to those of us whose knowledge of chemistry has been out-dated by comparatively recent developments. In "Elements of Materials Science,"* by Prof. Lawrence H. Van Vlack, Department of Chemical and Metallurgical Engineering, University of Michigan, we have found what we were searching for.

The author's introduction states: "The subject matter taught in Engineering Materials courses is changing rapidly. Formerly, this subject was taught on an empirical basis. Now, although the science of materials is far from complete, it can be approached from a more scientific viewpoint, because of the development of principles which relate the properties and behavior of many materials to their structures and environments."

The text has been designed for freshmen and sophomore engineering students, so it is comprehensible to most all those in our industries who have an elementary knowledge of chemistry in addition to experience with and an empirical knowledge of the materials they produce or use. In our particular field of rock products materials, the

field is wide open to gain new knowledge and develop new theories.

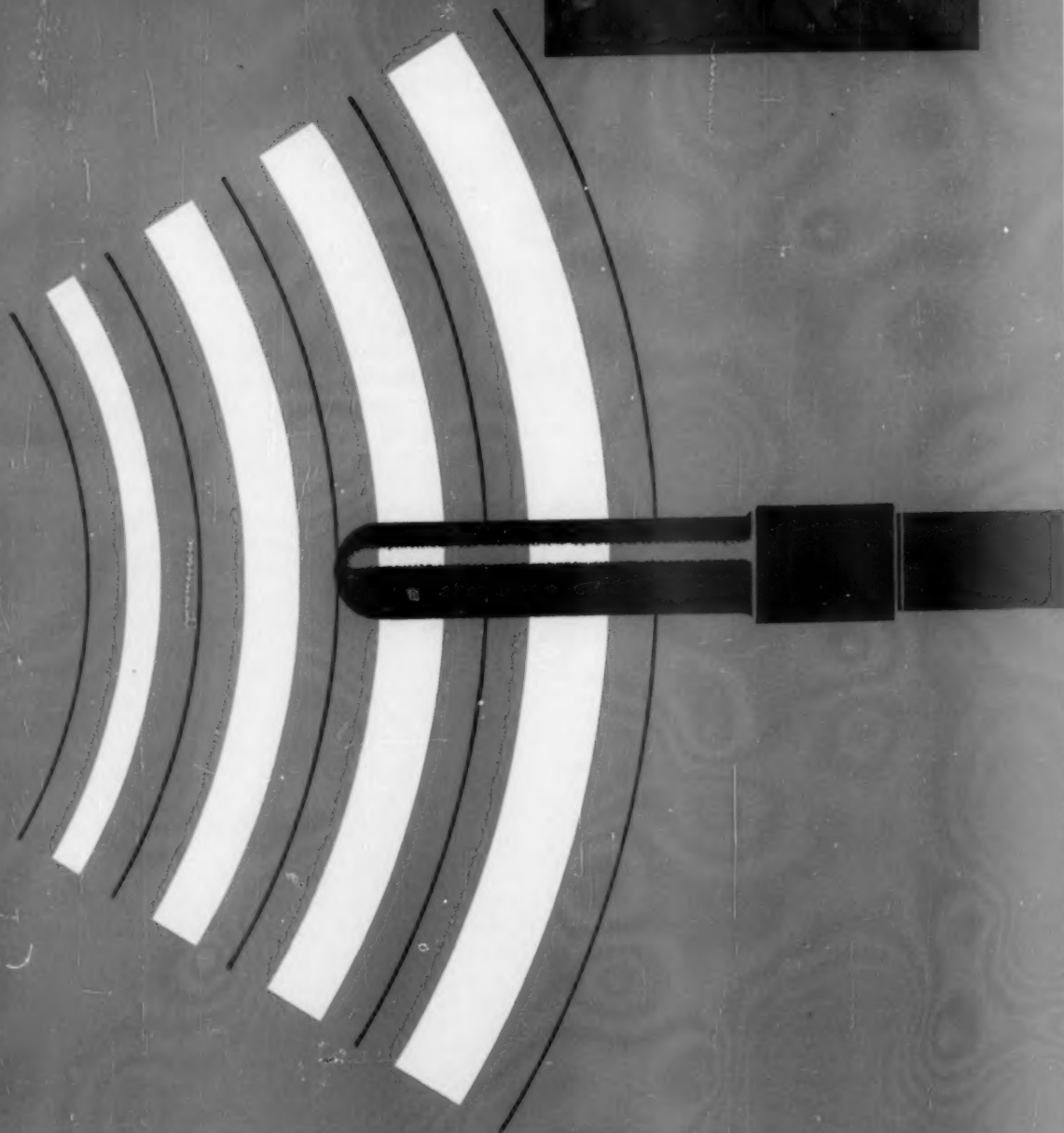
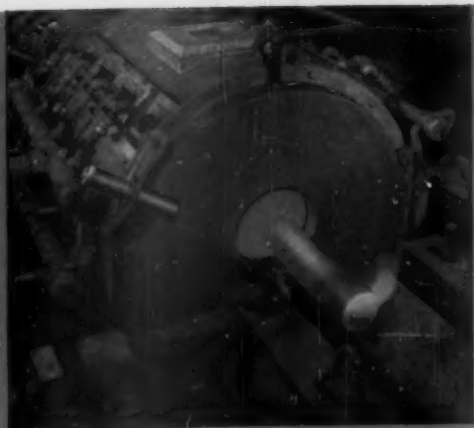
As would be expected from a teacher of metallurgy, most of the examples are from this particular science; yet the author is familiar with concrete and is able to point out how the same theories apply. For example, in Chapter 9 on Modification of Properties Through Changes in Microstructure, it is stated: "The fact that phases and microstructures in a material can be modified permits the engineer to choose a combination with the properties most suitable for a given application. Several parameters [arbitrarily selected constants] may be modified when more than one phase is present: (1) The relative amounts of the phases may be varied. As the properties of the phases differ more and more markedly, the effects of such variation increase. (2) The size of the phase grains within the microstructure may be varied. (3) The behavior of the material can be modified by changes in the relationship of shape and distribution of the phases."

Portland cement manufacturers and engineer users are quite familiar with the truth of those statements, but their knowledge is based almost entirely on the particular empirical results of experiments rather than on broad theoretical approach. Here, again, examples are taken mostly from metallurgy, but cement manufacturers can see the truth in the knowledge that has been gained of clinker composition, and the insistence of engineer users on modifications which they have deemed advisable to attain their objectives. Yet the true scientific explanation of why certain results may or may not be attained is still something for them to learn from a more comprehensive knowledge of the science of materials.

The author's treatment of concrete varies somewhat from present texts on portland cement and concrete, for the evident purpose of showing how

Please turn to page 126

*Addison-Wesley Publishing Co., Inc., Reading, Mass., 1960 (original publication date, May 21, 1959), price \$8.75



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For more than 20 years, *Radiamatic* Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years Honeywell has developed special infrared techniques and equipment for a wide range of applications, including heat treating furnaces, soaking pits, induction heating and melting furnaces, forging furnaces, high-speed salt baths, kilns, and many others.

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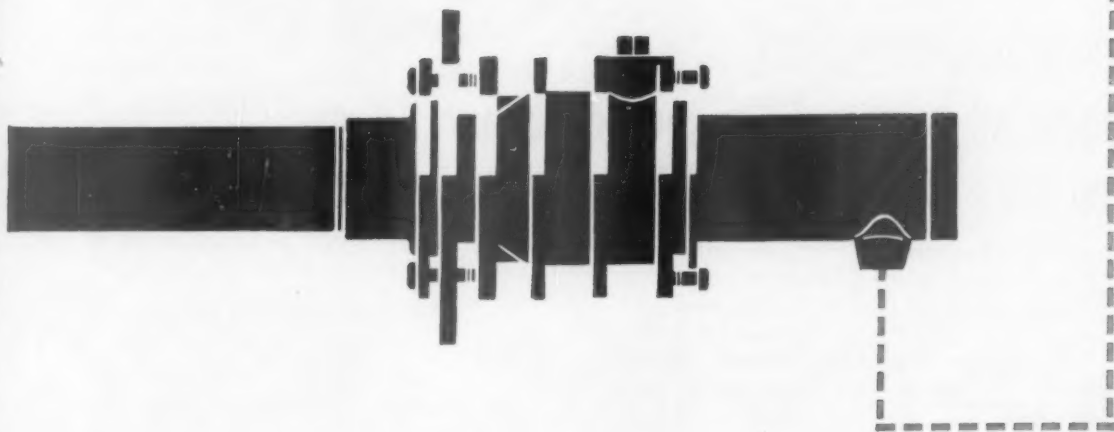
Your nearby Honeywell Field Engineer will be glad to discuss your temperature measurement and control problems with you. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pennsylvania.

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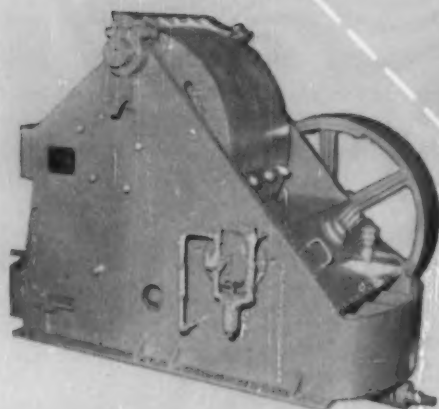


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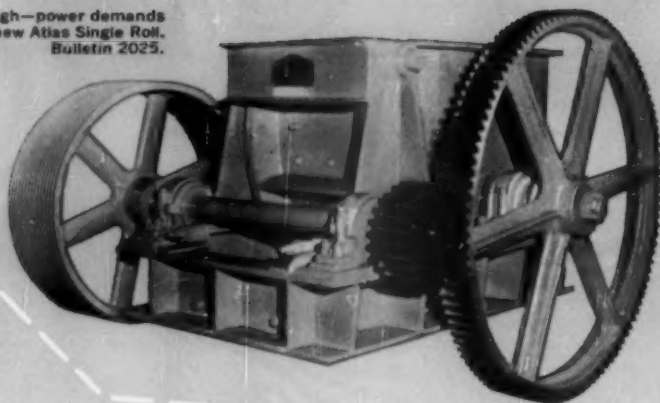
SINCE 1885



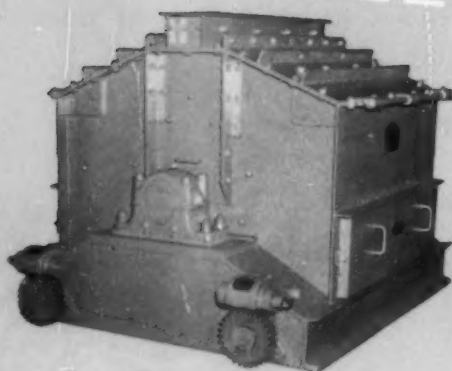
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BATH-BUILT



WASHINGTON LETTER

by EDGAR POE

Work begins On longest Bridge tunnel

Trade association representatives and Bureau of Public Road officials in Washington were among hundreds that attended the beginning of work on the world's longest bridge-tunnel combination that will span the mouth of the Chesapeake Bay near Norfolk, Va. The 1,764-mile highway, which will cost nearly \$200 million will link the Virginia eastern shore with the Norfolk mainland. It will remove the last major water barrier that historically have kept Old Dominion communities of the Tidewater's peninsulas separated.

Lief J. Sverdrup of the consulting engineering firm of Sverdrup and Parcel, with headquarters at St. Louis, regards the vast project as the most fascinating in the world today, plus the most challenging. Sverdrup and Parcel designed the project which will take more than three years to build. It will involve two tunnels, two fixed bridges and more than 14 miles of trestle.

The bridge-tunnel route will extend from the Chesapeake Beach area, 18 miles from downtown Norfolk, Va., to Wise Point on the tip of Cape Charles. It will span the area where the waters of the Chesapeake meets the frequently turbulent waters of the Atlantic Ocean.

The bridge-tunnel route will supplant a ferry fleet which makes 90 crossings daily, which in 1959 carried more than 700,000 vehicles. It will sharply cut the travel time between New York and the New England states and Florida. The minimum toll for a motorist may be \$4 one-way.

Middle U. S. Cities grow Fastest

Metropolitan areas ranging from 500,000 to 1,000,000 persons increased the greatest during the past decade. On the other hand, the smallest growth in metropolitan areas was registered in areas of less than 100,000 population. The Bureau of the Census says the records show that in metropolitan areas of 500,000 and up the suburbs grew faster. However, in cities of 100,000 or less, the central city increased faster than the area just outside the city limits. A major reason that the metropolitan areas of

from 500,000 to 1,000,000 grew faster, is because most of them had marked industrial development.

The Census Bureau records show that the 20 largest cities in the United States, in order of their size, are: New York, Chicago, Los Angeles, Philadelphia, Detroit, Houston, Baltimore, Cleveland, Washington, St. Louis, Milwaukee, San Francisco, Boston, Dallas, New Orleans, Pittsburgh, San Antonio, Seattle, San Diego and Buffalo. Twelve of these cities, however, showed losses ranging from 2.9 percent in New York to 15.4 percent in Boston. Eight of these cities rose in population ranging from 8.9 percent in New Orleans to 63.7 percent in San Diego.

More spending, Higher taxes Are probable

John F. Kennedy, as the 35th chief executive of our country, will not be nearly as liberal a president as he was in his campaign doctrine. However, it appears highly probable that the American people can expect more central government, more federal spending and higher taxes the next four years. A coalition of the conservative Southern wing of the Democratic party and the minority Republicans in the Senate and House appears to be the paramount hope of preventing higher taxes.

There can be little doubt that the 87th Congress will increase minimum wages and extend coverage to several million Americans not now covered by the minimum wage provisions. Mr. Kennedy made an all-out pledge to raise the minimum wage.

On the unfavorable side for the rock products field, as well as business and management in other fields, the liberal Democratic platform calls for more central government in Washington, more spending and inevitably more taxes.

A major question is: Where is the money coming from?

The Democrats are on the spot. They not only control the White House, but both branches of Congress, and most of the federal judiciary got there through appointment of a Democratic president prior to the Eisenhower administration. President Eisenhower appointed a few Democrats as judges.

Important Highway Reports

Three important reports dealing with highway development in our country are ready for submission to Congress.

One deals with contributions to costs by non-highway users. Another involves a revised estimate of the cost of the 41,000-mile interstate highway system, and the third pertains to sizes and weights of commercial vehicles.

The first report grows out of four years of study by the Bureau of Roads. There are a number of important non-highway user activities which benefit materially from the modern highways. These, of course, include industries and motels, among others.

The new report shows an estimate of cost for various operations in highway construction was made in 1958. Those changes are said to be relatively small.

The third report, dealing with sizes and weights of commercial vehicles, may change the limits set up in 1946, the year in which the present sizes and weights were decided upon. The problem is that there are still thousands of miles of roads that cannot accommodate more than present limits. This may result in establishing limits for trucks which operate on the interstate system.

Stone and clay Industry growth is substantial

The results of the new United States Census of Manufacturers have turned up some significant industrial surprises.

The industrial growth in the suburbs has been substantial in some areas and explosive in others. The latest census shows that there were 95,461 plants in the United States in 1958 employing 20 or more persons. This number is compared with 90,453 in 1954 and 83,230 in 1947.

One of the industries that has shown marked growth is the stone, clay and glass products. The new census shows that in 1958 there were 4,510 stone, clay and glass products plants with 20 or more employees, as compared with 3,333 in 1954.

The census records show that producers of stone, clay and glass products grew faster than industry as a whole, if measured by the total value added by manufacture.

More young men Being sought in Building crafts

There are not enough young men entering most of the building trade crafts despite the long-term advantages and

the expected growth in most of these crafts, Secretary of Labor James P. Mitchell declares. A con-

tinuing growth of construction activity is expected during the coming decade as a result of the expansion and population growth, a shift of population from the cities to the suburbs and a continuing high level of government expenditures for highways and other public works.

The Cabinet Officer said that by 1970 it is expected that about 4,200,000 skilled building trades workers will be employed, an increase of 1,200,000 over those currently employed in these crafts. Because the Labor Department recognizes the importance of the skilled building trades, it conducts a continuing program to promote the growth of this skilled work force through vocational guidance of young workers. It is done through the "Bureau of Apprenticeship and Training."

The Labor Department estimates that approximately 15,500,000 young men will be entering the labor force during the next 10 years.

Labor seeks End of state Work laws

Labor is going to make a concerted effort to get the new Congress to pass a law that would outlaw all state right-

to-work laws. However, the big labor chieftains will run into extremely heavy opposition from the coalition of Southern Democrats and Republicans. The "Sit-us Picketing Bill," which would permit secondary boycotts in the construction industry, will also be pushed by labor. Nevertheless, it is destined to meet with a barrage of opposition in committee as it did in 1960.

When the labor law fight begins, the entire field of labor reform legislation will be opened up. Just how strong the Kennedy Administration takes in the field of labor law remains to be seen.

Small business Loans pass one Billion mark

Since the Agency's financial assistance program began in September, 1953, through September, 1960, SBA approved

21,288 small business loans for \$1,002,738,000 and 9,513 disaster loans for \$104,943,000, making a cumulative total of 30,801 loans for \$1,107,681,000. Of the total business loans approved, 14,637, or 68.8 percent, for \$555,679,000 went to concerns engaged in non-manufacturing industries; and 6,651, or 31.2 percent, for \$447,059,000 went to those engaged in manufacturing. The Agency approved 13,592 loans for \$690,543,000 in participation with banks, and 7,696 for \$312,195,000 as direct loans. The average size of SBA business loans is slightly over \$47,000, and the average length of the loans is about six years.

Geared by Fuller...

In Brazil's southern frontier country, the third largest hydroelectric project in Latin America is under construction. 65 KW-Dart Trucks equipped with Fuller 1220 Series Transmissions are providing reliable work-power

**Where availability
is a MUST**



To harness much of Brazil's tremendous water power potential, Central Eletrica de Furnas is building a 400-foot-high dam across the Rio Grande River. Completion date for the dam, which will create a reservoir 150 miles long, was originally set for 1965, but an earlier finish is now in sight.

Contributing greatly to the accelerated construction schedule are 65 Fuller-geared KW-Dart Trucks used on the project. 55 of the KW-Darts

are Model 25SL, 25-ton dump trucks equipped with 320 hp diesel engines and Fuller 10-F-1220 10-speed Transmissions. The remaining ten are heavy-duty KW-Dart Diesel Tractors, seven of which are equipped with 10-F-1220s and the other three with Fuller 5-F-1220 5-speed Transmissions. The tractors are used to transport cement and move heavy equipment.

Working more than 6,000 miles from Kansas City, Mo., where they

were built, the trucks were selected because of the dependability of their component parts. Reports from the project site indicate that the heavy-duty Fuller Transmissions in the mountain-moving fleet have been instrumental in the trucks' excellent record of performance and availability on one of the world's most dramatic construction jobs.

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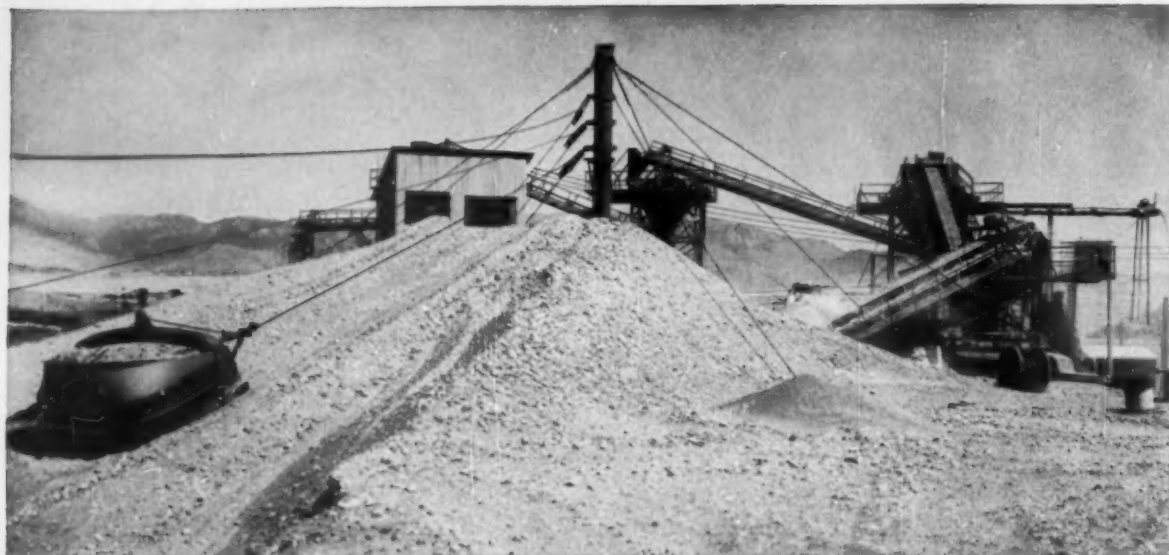
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ROCK PRODUCTS, January, 1961

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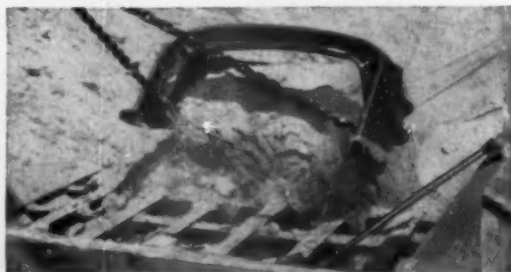
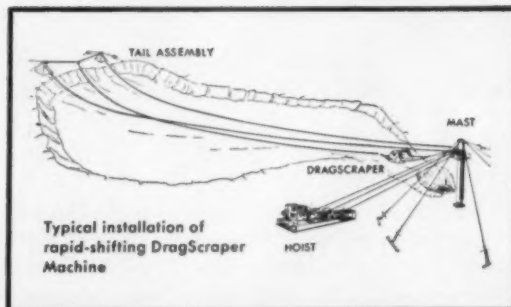
Dig and haul from your high bank, deep pit or underwater deposit direct to plant hopper or stockpile for 6 cents per ton. This cost is based on current job figures for Sauerman DragScrapers operating over average depth and haul distances.

The reason: one man and one machine handle the entire job. You save money three ways over multiple machine methods. Your power costs are much lower. A single operator replaces two or more on your payroll. Your maintenance costs are much lower because only the DragScraper Bucket and cable contact the material handled.

If you are hauling over distances up to 800 ft. or digging under water at depths to 100 ft.—the Sauerman DragScraper Machine is the most economical means you can use.

You can get DragScraper Machines in sizes from 1/2 to 15 yds. to match your tonnage requirements. Write or call about the physical dimensions of your deposit. We'll recommend the proper machine. For general information and detailed data on specific installations request Catalogs A and SG-1.

Plant Operators Are Saving On Power, Labor And Maintenance With Sauerman DragScraper Machines



DragScraper Bucket deposits load of sand onto grizzly hopper.

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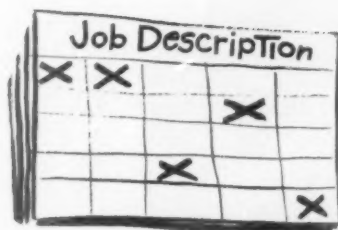
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LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS
AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?



Can you eliminate five jobs and assign the duties to other workers?

What Happened: After a long study of its operations, management came to the conclusion that a realignment of jobs was necessary. It called the union in and told of its decision to improve efficiency. This meant the elimination of 5 jobs—a cut in the workforce by 25 employees—and assignment of additional duties to remaining workers.

The union objected to the company's contemplated action. It argued:

1. You cannot take unilateral action on so drastic a change. This calls for negotiation.
2. The fact that you called us in to tell us about this implies that we should play a part in the final decision.
3. By assigning additional duties to other workers, you are overloading them. Work loads are always subject to negotiation.

The company position was:

1. We have a clause in our contract that says the union will cooperate with management to "the advancement of conditions looking forward to a profitable operation." Your attitude doesn't sound like "cooperation."
2. We have a duty and that is to improve efficiency.
3. If, after we have installed the new duties, employees feel they are being overworked, we can take that issue up later.
4. We called you in as a courtesy. We want to get along and believe in giving you advance information on our plans. This does not compel us to negotiate.

Was the company:

Right? ☐ Wrong? ☐

What a board of arbitrators ruled:

"The first point to be decided is management's right to make such changes in job duties as it feels necessary for the successful operation of its plant. It is inherent in the nature of collective bargaining agreements that management has the right to make normal decisions and adjustments in employee assignments as are necessary. The elimination of jobs, the making of changes in the size of the workforce and the assignment of new tasks is clearly included within the terms of 'operation of the plant and direction of the working force.' It is a well-established principle that management has the right to change or eliminate job classifications in the interest of economy and efficiency—unless this right is specifically restricted by the collective-bargaining agreement. This contract does not restrict management in this regard. Management's action is within its rights. Grievance denied."

Can an employee be disciplined for threatening a slowdown?

What Happened: When Bill Smith was told by his foreman that the standard for the job had been increased, the worker replied: "I don't like what's going on here. I can't earn what I think I should under the new standard."

The foreman tried to placate the worker but Smith insisted that he was not getting a fair shake. He finally said: "If this thing goes through, you're not going to get any more work out of me. I'll just produce enough to get by—no more, no less."

"You always made a bonus on this job," the foreman said, "and I expect you'll do the same in the future."

"No bonus," Bill answered. "I'm go-

ing to produce only the minimum."

"If you don't put in a fair day's work I'll have to do something about it," was the supervisor's reply.

"I'm not changing my mind," Bill insisted and thereupon was sent home on a one-day suspension.

At arbitration the company argued that Bill's attitude toward his job was improper and that he insisted he was not going to abide by the standard.

Bill's argument was that he couldn't be disciplined for "attitude." He must do something wrong before the disciplinary procedure can be applied.

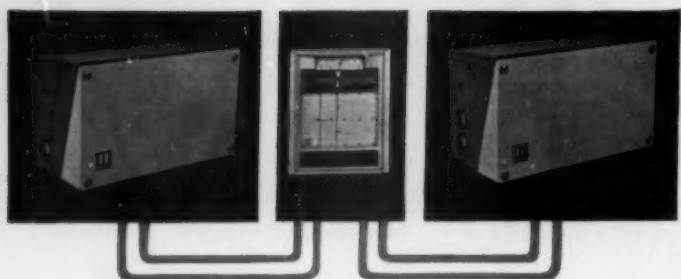
Was Bill:

Right? ☐ Wrong? ☐

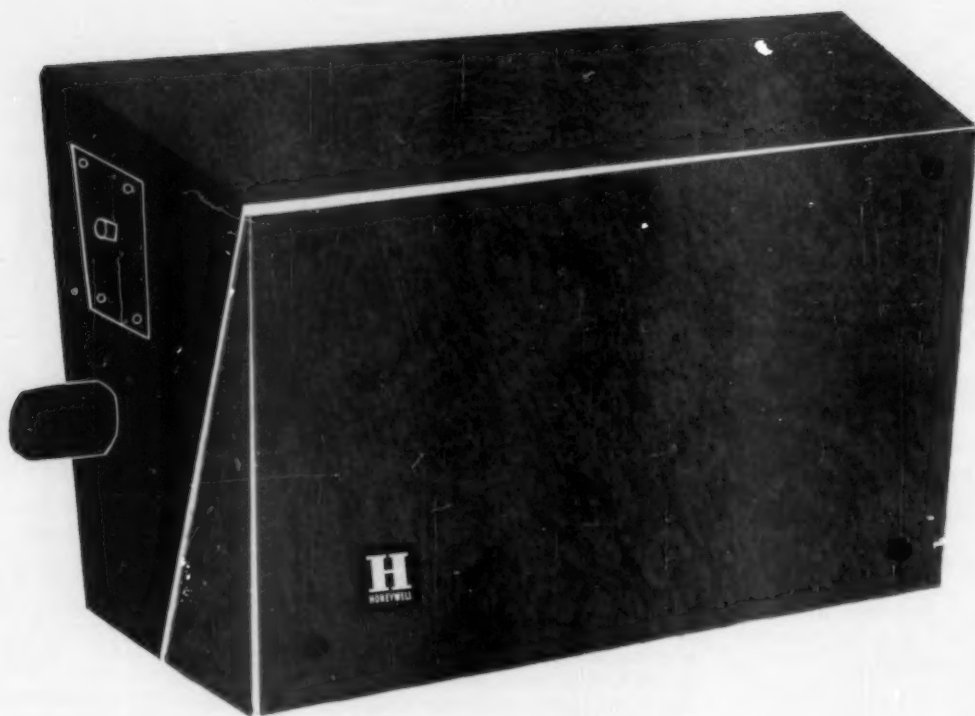
What Arbitrator Jensen ruled: "Certainly a worker has no right to exert pressure on the company by threatening to withhold work as a leverage to secure the setting of a better than normal standard. If there is a dispute over standard, it should be handled in the grievance procedure and should be tested against the established principles for setting it. However, it is held that he could not be suspended for cause until he had failed to produce—for to discipline a worker for his attitude, without an objective test against the results of his work, would make the matter entirely too subjective."

"Something more specific and objective is needed. Also the type of situation with which we are dealing is not like an act of insubordination, where a worker is refusing to obey an order. Bill Smith was not ordered to go to work and produce. It was proper that he should have been warned that if he did not produce a fair day's work he would be suspended. Then his output would have provided a test of his performance, and there would have been a case which could be resolved by reference to performance on the job. Smith is entitled to be reimbursed for the day's pay."

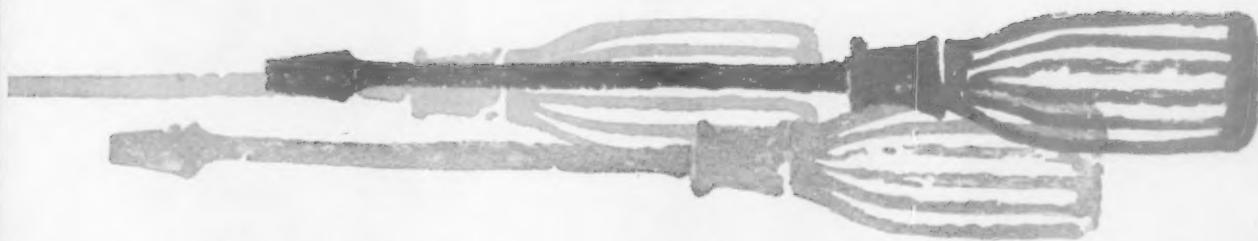
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No stand-by supervision needed when you install an *ElectriK Tel-O-Set* Control System. Installation crews never have to open an instrument cover to hook up the line . . . instrument crews never have to touch an outside line to service an instrument.

It's all in the *Tel-O-Set* connection system. All process connections are entirely isolated from the inside of the instrument case. Installation crews can mount, pipe, and wire the various *Tel-O-Set* instruments without removing the cover. Instrument chassis can be removed for servicing without breaking any external process or electrical con-

nection. Standardized parts, together with extensive use of quick-connect and plug-in design, minimize downtime and reduce spare parts inventory.

And there's more to the *ElectriK Tel-O-Set* economy story. Specifically, there's no external power required at any field-mounted *Tel-O-Set* instrument. Line power connection is made only at the receiver. Two-wire d-c transmission reduces installation costs and eliminates shielding problems. Also, the 4-20 milliamp signal range of the system gives a live zero and permits the use of the most reliable transistors available. The d-c signal can be fed into data handling systems and millivolt-actuated instruments . . . can be easily transduced to a standard 3-15 psi pneumatic signal to operate existing pneumatic systems. Take a new look at your control problem with the *ElectriK Tel-O-Set* System in mind! Get the complete economy story from your local Honeywell field engineer. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, 21 Penn Street, Fall River, Massachusetts.

Honeywell



First in Control

SINCE 1885

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PEOPLE IN THE NEWS



Raymond B. Ladoo receives award

RAYMOND B. LADOO, consulting engineer of Newton, Mass., has been named recipient of the Hal Williams Hardinge Award for 1960 by AIME in recognition of outstanding achievement in the field of industrial minerals. A graduate of Harvard University, Mr. Ladoo has long been active in the industrial minerals field. He has written numerous technical articles and is author of the book *Nonmetallic Minerals*. He has been a member of AIME since 1914.

Mr. Ladoo began his career in Virginia with the Low Moor Iron Co. and John B. Gurensey & Co., Inc. He later joined the U. S. Bureau of Mines in Washington, D.C., and subsequently became associated with the United States Gypsum Co., Chicago, Ill. Among other companies and organizations with which he has been associated are: Colorado Fluorspar Corp.; Organo Inc.; Colonial Mica Corp.; New Products Research Corp.; Nieder Fused Quartz Co., and the War Production Board for which he was chief of the Mica-Graphite Branch.

Mr. Ladoo, who maintains an office at Newton, Mass., as an industrial minerals consulting engineer, is an authority on talc and fluorspar and the economics of the nonmetallic minerals industries.

Marquette appoints Duncan treasurer

PAUL DUNCAN, vice president and director of Marquette Cement Manufacturing Co., Chicago, Ill., has also been named treasurer of the company.

Drummond Dolomite manager retires



CURT G. KNOBLOCK has retired as general manager of Drummond Dolomite, Inc., Drummond Island, Mich., after 16 years as supervisor of quarry operations. He will be succeeded by Arvin Mueller, a mining engineering graduate of Missouri School of Mines, who was formerly drilling and blasting superintendent.

Mr. Knoblock's retirement ends 40 years of active service in quarry operations, including 24 years on the Great Lakes. After service in World War I, he finished his schooling at Armour Institute of Technology and the University of Wisconsin, where he obtained degrees in civil and mechanical engineering. He started his career in quarry work in Mendota, Ill., in 1920. In 1936 he moved to northern Wisconsin as general manager of the Sturgeon Bay Co., predecessor of Drummond Dolomite, Inc. In 1944 the plant was moved to Drummond Island, Michigan.



Ahearn rejoins NSGA staff

VINCENT P. AHEARN, JR., has rejoined the National Sand & Gravel Association as assistant to the associate managing director. Mr. Ahearn, who has an AB degree from Harvard University and an LL.B. degree from Georgetown University, served on the NSGA staff for some time prior to his entry into the service where he has been for the last three years.

Kaiser Gypsum appoints Caprye superintendent

CHARLES E. CAPRYE, formerly assistant plant superintendent, has been promoted to superintendent of the Seattle, Wash., plant of Kaiser Gypsum Co., succeeding John O. Lewis who has retired after 13 years of service.

Mr. Caprye, a native of Spokane, Wash., and a mechanical engineering graduate of Washington State University, joined Kaiser in 1955 as design engineer, later plant engineer and then assistant plant superintendent.

Mr. Lewis joined Kaiser Gypsum Co. in 1947 and served as superintendent at each of the company's California plants prior to the Seattle plant. He is a native of Georgia and he was graduated from Georgia Institute of Technology.

(Continued on page 33)

The BELT Lasts Longer!

(and so do maintenance dollars!)



...with McNally Pittsburg's new conveyor

Here is a new and entirely different type of belt conveyor. The secret of its amazingly improved efficiency is in the exclusive design of the McNally Pittsburg patented cradle idler, which consists of 5" rubber rollers, assembled on precision-ground ball bearings, prelubricated and lifetime sealed. The rollers are suspended in a true catenary, on flexible, nonrotating stainless steel wire rope, which cannot corrode. Because the wire rope does not rotate, it cannot twist and cause loping, dangerous harmonics, and undue belt wear.

The wire rope is supported at each end by a simple ball joint, so it is free to move in any direction, permitting the belt to adjust itself to any profile. The true catenary suspension provides uniform belt support without bends or creases. *Thus belt life is substantially increased.* The entire conveyor is shipped disassembled, and may be put together in the field to fit your application.

Secret of the
Patented
McNally-
Pittsburg
Cradle Idler



...the
Wire Rope
Does Not
Rotate!

McNALLY PITTSBURG

McNally Pittsburg Manufacturing Corporation—
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
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**Write
Today**

McNally Pittsburg Mfg. Corp.
Dept. RP
Pittsburg, Kansas

- ☐ Please send information on the new McNally Pittsburg Belt Conveyor.
- ☐ Have Sales Engineer call for further consultation.

NAME _____ TITLE _____

COMPANY _____

CITY _____ STATE _____

HERE'S HELP

It's the authoritative *Handbook*—newly revised—used and prized by progressive aggregate producers everywhere. Complete information on aggregate and aggregate production machinery, with helpful engineering tables and charts.

Saves going through a lot of different books. Its 128 pages (that lie flat) tell you what you want to know—fast.

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PEOPLE IN THE NEWS

continued from page 30



Dundee Cement elects new president and board chairman

ROBLEE B. MARTIN (left) has been elected president of Dundee Cement Co., Dundee, Mich., succeeding Dr. Hans Gygi (right) who becomes chairman of the board.

Born in St. Louis, Mo., Mr. Martin was graduated from Columbia University where he received his BS and MS degrees in chemical engineering. He was director of research and development of Mississippi Lime Co. for 10 years prior to joining Dundee in 1959 as general manager. One year later, he was appointed vice president and general manager.

Dr. Gygi has his headquarters in Zurich, Switzerland, where he is also managing director of the Holderbank Cement Co. and a director of Holderbank Financiere Glaris S. A. Besides his executive posts at Dundee and the St. Lawrence Cement Co., Quebec, Canada, where he is board chairman, Dr. Gygi is a director of 27 other companies. He is chairman of the Association of Swiss Portland Cement Manufacturers, a post he has held since 1934.

Masson retires from Carbon Limestone Co.

URBAN F. MASSON has retired as general superintendent of the Carbon Limestone Co., Lowellville, Ohio, after 40 years of service. He will be succeeded by Walter S. Harmon who has been serving as mechanical department superintendent. Born in Mercer County, Pa., Mr. Masson joined Carbon Limestone Co. in 1920 and became general superintendent in 1946.

H. A. Sawyer elected PCA board chairman

H. E. SAWYER, chairman of the board and president of Lone Star Ce-

ment Co., New York, N.Y., has been elected chairman of the board of directors of the Portland Cement Association. Mr. Sawyer, who succeeds Cris Dobbins, president of Ideal Cement Co., Denver, Colo., has been actively engaged in PCA affairs for several years, serving as a member of the board in 1955, and as a member and chairman of several PCA committees since 1956.

Five new directors were also named to the board. They are: L. E. Bayer, president, National Cement Co., Bir-



mingham, Ala.; R. M. Craigmyle, chairman of the board, Giant Portland Cement Co., Philadelphia, Pa.; H. R. Schemm, president, Huron Portland Cement Co., Detroit, Mich.; Charles E. Shearer, president and chairman of the board, Keystone Portland Cement Co., Philadelphia, Pa., and Paul Sunderland, chairman of the board, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.

Mr. Sawyer is a graduate of Texas A. & M. College, with a BS degree in civil engineering. He served for two years as field engineer in Texas for the Portland Cement Association before joining Lone Star Cement Co. in 1925 as a service engineer. He was elected president, a director and a member of the executive committee in 1952, and became chairman of the board in 1959. Mr. Sawyer is also president and director of Compania Argentina de Cemento Portland, La Compania Cubana de Cemento Portland, and Compania Uruguay de Cemento Portland, all subsidiaries of Lone Star Cement Co.

A past president of the Louisiana Section of the American Society of Civil Engineers, Mr. Sawyer was recently elected a life member of that society. He is a member of the board of the American Mining Congress, and chairman of its advisory committee for the cement industry. He also is a member of the American Concrete Institute and the American Society for Testing Materials.

OBITUARIES

Harold F. Clemmer, who served for 29 years as engineer of materials for the District of Columbia Highway Department, died October 5. He was 72 years old. Born in Hampton, Iowa, Mr. Clemmer received a BS degree in civil engineering from Iowa State University, where he was an associate professor of civil engineering. He became engineer of materials for the Illinois Highway Department and served as technical adviser to the Solvay Process Co. before moving to Washington.

Mr. Clemmer was a member of the American Concrete Institute, American Society for Testing Materials, American Road Builders' Association, Highway Research Board, American Association of State Highway Officials, American Society of Civil Engineers.

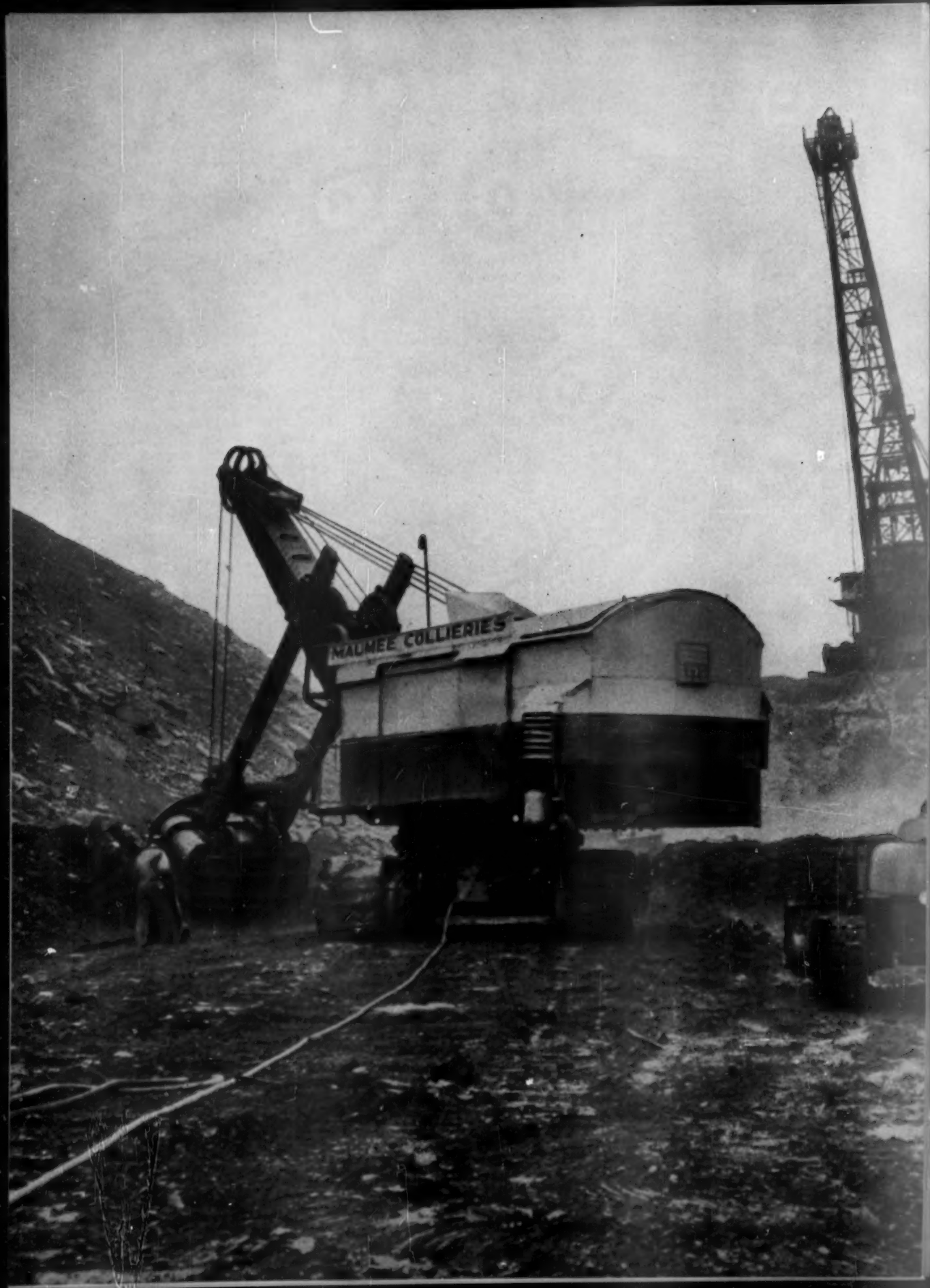
John L. A. Galster, a founder and former president of the Petoskey Portland Cement Co., Petoskey, Mich., which was sold in 1955 to Penn-Dixie Cement Corp., died October 26. He was 81 years old. Mr. Galster was also a founder and first president of the Petoskey Chamber of Commerce. He served as mayor of Petoskey from 1921 to 1924 and was a member of the first State Conservation Comm.

Rear Admiral Ernest Lee Jahncke (USNR Ret.), former president of Jahncke Service, Inc., New Orleans, La., and a brother of Paul F. Jahncke, chairman of the board, and the late Walter F. Jahncke, died November 16. He was 83 years old. Former assistant secretary of the Navy, Admiral Jahncke was graduated from Tulane University School of Engineering in 1899 and later became associated with his brothers in Jahncke Service, Inc.

Alford N. Bustion, superintendent of the Pollock, La., plant of the Witte Gravel Co., Lake Charles, La., died November 8 at his home in Waldo, Ark. He was 63 years of age.

Thomas N. Lavery, co-owner of the Wayne Sand & Gravel Co., Belleville, Pa., died November 6 after a short illness. He was 67 years old.

END





At the Maumee Collieries in Indiana...

ANACONDA SHOVEL CABLE HAS A RECORD: 10 YEARS ON THE ROCK PILE!

Anaconda's SH-D Cable gives many years of dependable service in spite of heat, moisture, kinks, rocks and runovers!

How many shovel cable hazards can you count in this picture from the Maumee Collieries? Rocks... moisture... kinks... danger of runovers—they're all there. Yet the first installation of Anaconda's rugged SH-D Shovel Cable has resisted them all—for 10 long years!

It's proof again of the way Anaconda's in-the-field experience with Shovel Cable pays off in a superior cable for you. The important knowledge gained from use and testing of SH-D Cable *on the job* in our own mines goes into the design and manufacture of Anaconda Shovel Cable.

For example, the insulation is Anaconda Butyl (AB). Nothing can beat it for withstanding ozone, heat and moisture. Patented rubber cores cushion the ground wires and help prevent breaks from kinks and runovers. SH-D has a neoprene jacket that is exceptionally tough and abrasion-resistant. And every design, every component has been job-tested—your assurance of superior quality and performance.

Call on the Man from Anaconda with your cable problems. Or see your local Anaconda distributor. For new descriptive Bulletin DM-5818, "Anaconda Security-flex Portable Cables for the Mining Industry," write: Anaconda Wire & Cable Co., 25 Broadway, New York 4, New York.

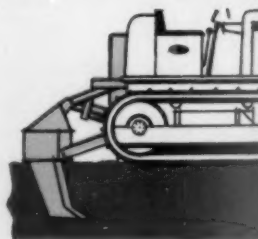
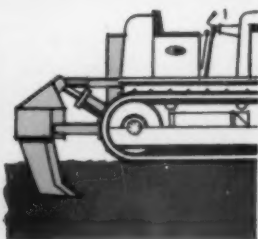
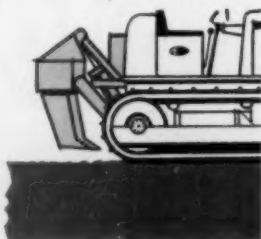
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◀ For a decade, the Anaconda SH-D Shovel Cable you see here has been giving dependable service for the Maumee Collieries, Jasonville, Indiana. Its many superior design features enable it to resist on-the-job hazards that would knock out ordinary shovel cables.

ASK THE MAN FROM
ANACONDA®
FOR SHOVEL CABLE



The unique parallelogram design of Allis-Chalmers rippers keeps shanks at the most effective angle . . . up . . . halfway down . . . down full depth.



TOUGH TOOLS MATCH TOUGH JOB POWER

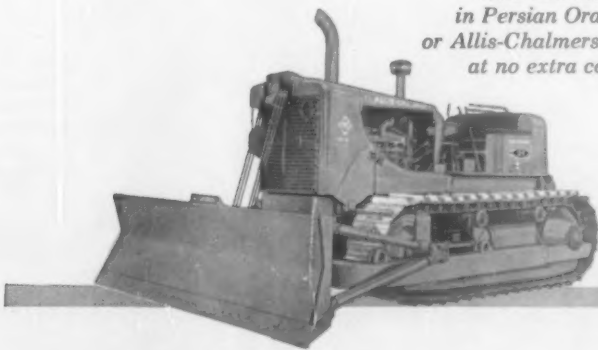
Allis-Chalmers rear-mounted rippers maintain most effective penetration angle at all depths . . . up front, specially designed bulldozers make most of HD-21's tremendous power.

Modern tractor power, *plus* modern ripper and dozer design, is making a big difference on today's tough jobs. With the HD-21 and ripper, for instance, up to 60,000 pounds of draw-bar pull let you rip 'n' doze what you once shot and shoveled . . . puts one man, one modern machine in place of a typical 4-man blasting operation.

Allis-Chalmers leads the field in making rippers practical and effective for these tough jobs. The introduction of *parallelogram design* — unique Allis-Chalmers feature on these big HD-21 rippers — keeps shanks at most effective penetration angle at all depths. You get the *same* effective tooth angle . . . up . . . halfway down . . . or working a full two feet deep!

In addition, Allis-Chalmers dozer design utilizes the latest developments in steel to produce durability which makes the most of today's big tractor power without profit-killing maintenance and repair. Trunnions, "C" frames, struts and moldboards match the HD-21's brute strength. If you're bidding or working *any* tough materials, your Allis-Chalmers dealer will furnish all the facts on successful ripper/dozer application. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Now available
in Persian Orange
or Allis-Chalmers Yellow
at no extra cost.



move ahead with

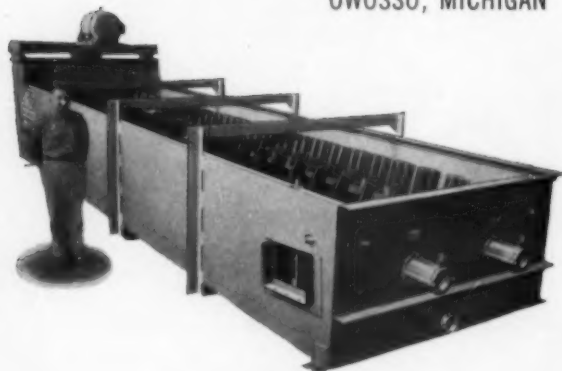
ALLIS-CHALMERS
power for a growing world





"WE GET QUALITY AGGREGATES FOR READY MIX From our Eagle Sand Washing Section and our Sol-Clay Washer"

-GRAND RIVER GRAVEL CO.
OWOSSO, MICHIGAN



The Eagle Sol-Clay Washer has corrugated paddles of wear resistant Ni-Hard chromium-nickel iron alloy. Paddles are replaceable and are bolted to lugs or spuds on the 10" dia. tubular steel shafts. The Sol-Clay Washer has proved itself for economical removal of soluble clays from gravel.

All aggregates, both fine and coarse, are processed by Eagle Equipment at the modern, efficient plant of Grand River Gravel Co. Much of the processed material goes to the Owosso Ready Mix Co. which is pleased with the excellent products that the Eagle Equipment is turning out. Area contractors are also pleased.

The Eagle Sand Section consists of a 20' Water Scalping-Classifying Tank with a 3-cell Collecting-Blending Flume and a 36" x 25' Single Screw Washer-Classifier-Dehydrator. One cell of the flume is set aside for future use, another cell collects and disposes of the excess of certain meshes of sand and the third cell delivers usable material to the screw unit. Supporting structurals and walkways were also designed and fabricated by Eagle.

The Sol-Clay Washer processes the gravel. The corrugated paddles abrade the gravel scrubbing it clean and at the same time break down pieces of soluble clay which go into solution and are floated out of the washer to waste. This type of clay does not require the heavy scrubbing action of the Eagle Log Washer, but is a little too tough for an Eagle Coarse Material Washer to handle—the Sol-Clay Washer fills the gap and does an excellent job.

Eagle builds THE complete line of aggregate washing equipment—for both fine and coarse aggregate. The large number of successful Eagle installations is your guarantee that Eagle Equipment can solve your problem. Send for Catalog.

Factory-Trained Distributors Everywhere!

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

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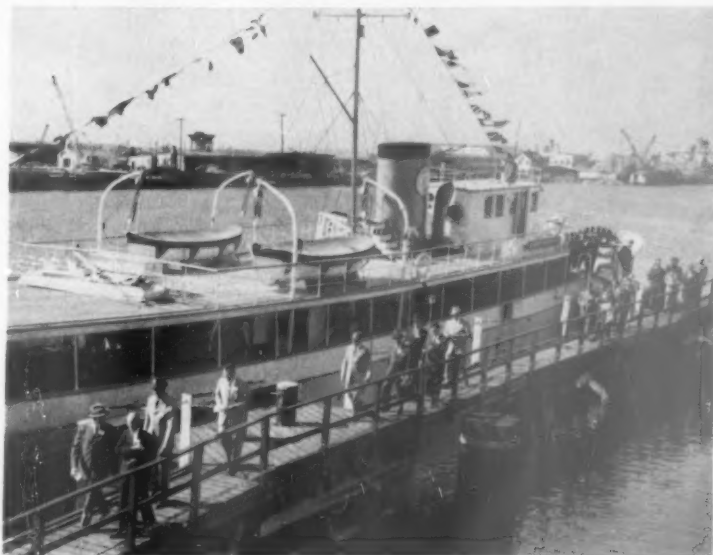


U. S. Gypsum burns lime from shells at New Orleans

THE FORMAL OPENING of New Orleans' first lime plant by the United States Gypsum Co. last October launched a new operation. It involves dredging clam shells from Lake Pontchartrain and converting them into lime products that will be used in Louisiana industries—paper, oil, sugar, aluminum, petrochemicals—in water softening and in road construction.

A group of 60 civic leaders and businessmen were guests of the company for a day of informal ceremonies. Highlight of the affair was a water tour of harbor facilities aboard

GUESTS disembark from Port Authority's yacht, *Good Neighbor*, after a two-hour cruise on the Mississippi river and Inner Harbor Navigational canal. This was the highlight of ceremonies that launched a new U. S. Gypsum lime plant in New Orleans—the fifth for the company.



RIGHT: Officials attending the open-house ceremonies for the U. S. Gypsum plant in New Orleans are: (left to right), Edmund J. Garland, president of New Orleans Belt Railroad; Gerald L. Andrus, president of New Orleans Public Service, Inc.; Robert D. Stephan, vice president of sales, United States Gypsum Co., and W. J. Amos, Director of the Port of New Orleans

the Port Authority's yacht, the *Good Neighbor*. After viewing the equipment and buildings that adjoin the gypsum-manufacturing plant from the Inner Harbor Navigational canal, the guests disembarked to inspect the premises at close hand.

The visitors saw how clam shells are washed, then calcined in a 250-ft. rotary kiln at 2,000 deg. F. before being conveyed to the processing machinery where they are ground into any of the three lime products that the company produces—quicklime, hydrated lime or building lime.

Robert D. Stephan, U. S. Gypsum vice president in charge of sales, explained why New Orleans was chosen as the site for the company's fifth lime plant. He said: "Our studies indicated excellent opportunities in this area for lime products, both at present and in the future. We are confident we have made a sound investment, and are happy to be an active participant in the dynamic growth and development of New Orleans."

(Continued on page 45)



ideas and news:



Latest step in mill trunnion drive evolution: New Twinducer drive divides mill load electrically, between twin synchronous motors. Compared to trunnion drives with mechanically divided load, the Twinducer drive requires 50% less space. Since there are no floating gears or pinions, gear wear is kept to a minimum. Twinducer drive fits any plans for automatic grinding operation.



For quality control . . . lower processing costs: Systemation engineers help you benefit from the degree and type of automatic operation most suited to your needs. Allis-Chalmers will undertake responsibility for the design of complete operating facilities. Systemation service is based on a thorough understanding of your processing requirements, gained from years as a process designer and major equipment supplier to your industry. Added is the experience of over 500 successful advanced electronic control systems by Consolidated Systems Corporation, an affiliate company.

Which of these productive ideas could be working for you?

A pump that defies wear. A high-voltage motor control center. These examples demonstrate the extra value that is standard with Allis-Chalmers...the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industrial Equipment Division, 905 S. 70th Street, Milwaukee 1, Wisconsin.



◀ **420,000 tons of sand pumped . . . no major repairs:** This A-C rubber-lined pump, in service almost five years, pumps rod mill discharge to sand screws for classification. It replaced an alloy metal pump which failed after pumping 10,000 tons. The alloy pump replaced a standard metal pump which failed after 4,000 tons. Only \$840 or about 2 mills per ton has been spent for repairs.

High output — low installation costs: One of the world's largest aggregate-handling screens met the needs of an aggregate producer for higher output and minimum installation costs. This 7 by 20-ft Ripl-Flo screen handles 600 tons per hour and is mounted on foundations previously used for a 5-ft screen.



◀ **So low, two fit where one used to go:** This new SpaceMaker control center is the first completely new 2- to 5-kv motor controller development in more than a decade. Two-high design can cut floor space needs in half. Full drawout construction makes it the safest, most easily accessible controller available. Flame-retardant, track-resistant Super Pyro-Shield insulation adds reliability. Walk-in Shelter-Clad enclosures available for outdoors.

A-C INDUSTRIAL EQUIPMENT DIVISION: motors, generators, controls, rectifiers, pumps, compressors, crushers, mills, screens, kilns, coolers, industrial systems.

OTHER A-C PRODUCTS: thermal, hydro and atomic electrical generating equipment; switchgear, transformers, unit substations; tractors, earth-moving equipment, engines, lift trucks.

A-1402

ALLIS-CHALMERS

Savings in engine costs alone make the "Euc" C-6 today's best tractor buy

In the Euclid C-6 you get the advantages of job proved power train components... the reliability of the GM 6-71 engine, Allison Torqmatic Drive and Euclid's famous planetary drive... that help keep downtime to a minimum. You get designed-in service accessibility that's unsurpassed by any competitive crawler... servicing or complete removal and replacement time is well below that required for comparable tractors.

You get a big advantage, too, in the lower cost of engine replacement parts... savings that cut your maintenance expense to the absolute minimum. For example, pistons and rings for two competitive engines are 79% and 163% higher in cost than for the GM engine; a water pump 255% and 257% more; up to 120% more in replacement of complete engine from fan to flywheel.

EUCLID Division of General Motors
Cleveland 17, Ohio

*Plants at Cleveland and Hudson, Ohio
and Lanarkshire, Scotland*

*Full-power shift... fast-as-a-fox
maneuverability... and greater
over-all work-ability!*



Have your dealer give you all the facts and figures on the C-6... you'll find that in production and maintenance cost this "Euc" gives you a better return on investment.



C-6 service accessibility cuts replacement labor costs, too!

Assuming good shop conditions and experienced personnel, these are typical times for removal and replacement of components in the C-6 and other torque converter tractors of the same class:

Component	Man-Hours	
	C-6	Others
Radiator	3	10
Engine	8	16
Clutch	none	16
Drive Sprocket	8	9.8**
Track Frame	3*	8**

*requires 70 ton press only

**requires special tools and 100 ton press

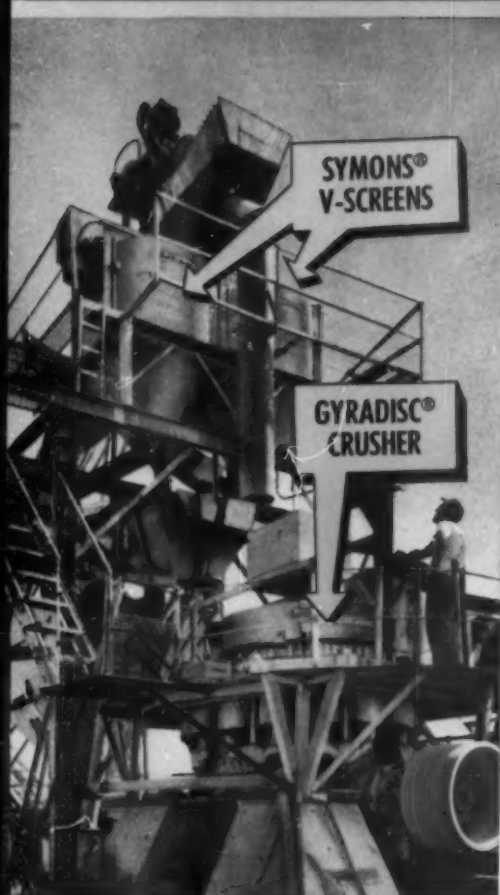
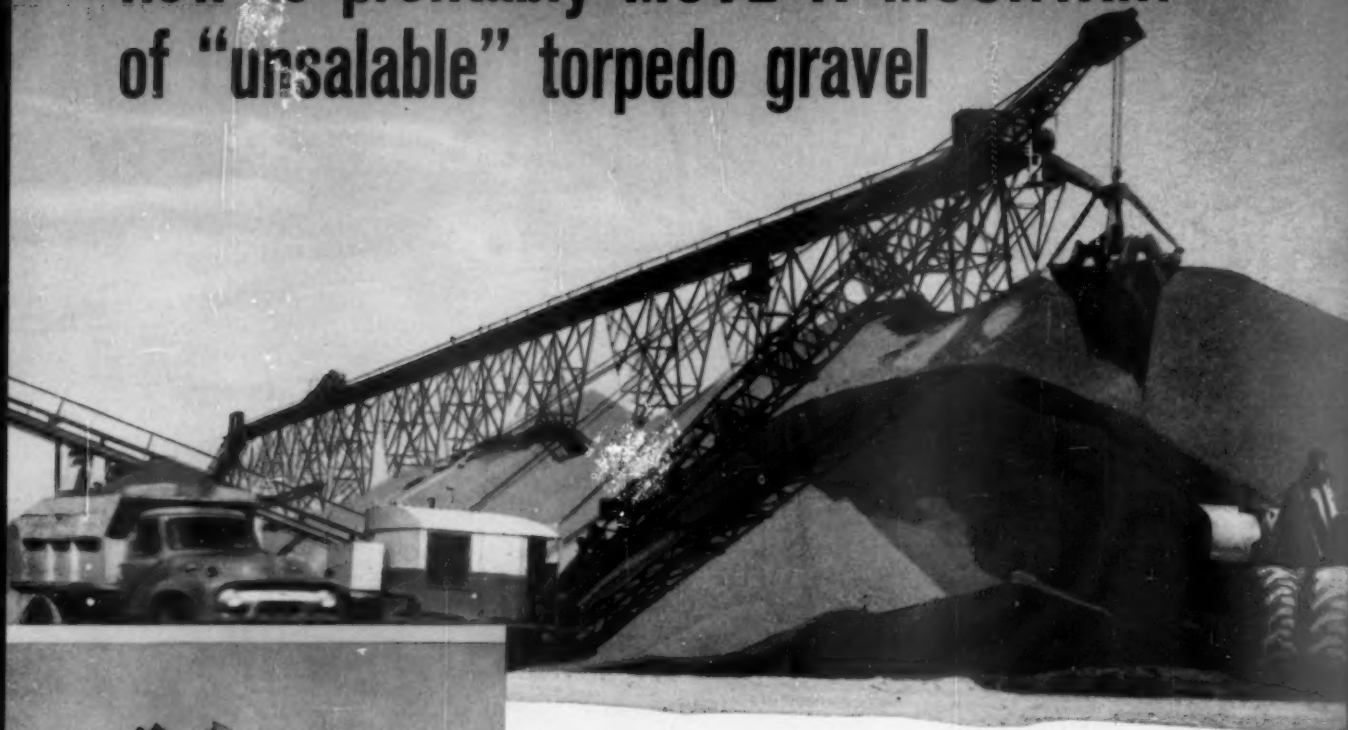
HOURS SAVED IN THE SHOP MEAN MORE WORK-TIME ON THE JOB!



EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

How to profitably MOVE A MOUNTAIN of "unsalable" torpedo gravel



When a mountainous pile of unsalable torpedo gravel threatened to engulf its plant property, Winter Bros. Material Co., Fenton, Missouri, producers of sand and gravel in the St. Louis area relieved their space problem and turned the big liability into a tidy profit. This was accomplished by the installation of a 54-in. Gyradisc Crusher and two Symons V-Screens. The Gyradisc converts $\frac{3}{8}$ -in. torpedo gravel (pea gravel) into salable, manufactured sand and another premium product, a filter medium, is produced through one of the two Symons V-Screens. The other V-Screen dewateres the torpedo gravel before crushing.

At present, the Gyradisc Crusher and the two Symons V-Screens handle a daily production of up to 500 tpd on intermittent operation.

In many operations, Gyradisc® Crushers supplement Symons® Cone Crushers for volume production of fine specification material. They are used for the production of agricultural limestone, limestone chips, sand, rock dust, crushed stone for asphalt mix and the fine reduction of asbestos, slag, talc, etc.

Write for Bulletin 228.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

**SYMONS . . . A registered Nordberg trademark
known throughout the world.**

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INDUSTRY NEWS

(Continued from page 39)



Armstrong named to top BHIF post

ELLIS L. ARMSTRONG, former Commissioner of Public Roads, U. S. Department of Commerce, takes office this month as president of the Better Highways Information Foundation. He brings several years of national leadership to help fortify an organization scarcely out of its swaddling clothes.

The Foundation was organized in 1960 as a non-profit, public service organization. It is devoted primarily to researching and disseminating information on the needs of national highways and their importance to the economies of the nation, the states and the local communities. In legislative and other matters pertaining to highways, the Foundation is strictly non-partisan.

In commenting on his acceptance of the BHIF presidency, Mr. Armstrong said, "I have been impressed with the fact that the American people generally desire a better understanding of how we can solve our traffic problems. This year, some firm decisions will be made on highway matters—not only in Congress, but in state legislatures."

Mr. Armstrong will direct the Foundation's activities from headquarters at 2000 K St., N.W., Washington 6, D.C.

New plant to produce nitrate of potash

SOUTHWEST POTASH CORP., a division of American Metal Climax, Inc., announced that it will build a \$7-million plant in Vicksburg, Tenn., to produce nitrate of potash. The plant will utilize a process developed at the Research Foundation of Colorado School of Mines.

(Continued on page 47)

STANDARDIZE ON THE "PAIR FOR WEAR" for hardfacing and manganese welding

There's no need to "buy the catalog" when the "Pair for Wear" can handle 90% of your build-up and hardfacing work. Use the "Pair for Wear" wherever you need high impact and abrasion resistance. *Standardize on them.*

But *test* them first, and see how the "Pair for Wear" get their reputation for handling ease, usability, fast deposit and good-looking bead. See if the "Pair for Wear" doesn't give you *the best results you've ever had.* Write us now for technical bulletin and test samples of rods.

Available in 50 lb. standard manual packages and 50 lb. semi-automatic coils.

*Trade Mark Registered



AMSCO

American Manganese Steel Division • Chicago Heights, Ill.



"Buy Through
Your Local
Welding Supply
Distributor"

Other plants in: Denver • Los Angeles • New Castle, Delaware • Oakland, California • St. Louis
Welding products distributed in Canada by Canadian Liquid Air Co., Ltd.

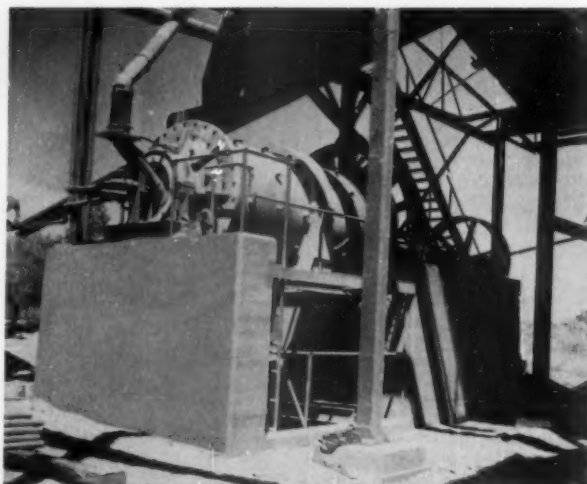
Enter 1425 on Reader Card



Why pay \$\$ for hauling sand ...when you can manufacture it on the job for only 25¢ per ton!

With a Marcy Center Peripheral Discharge Rod Mill you can produce whatever size fine sand you need from stone or excess pea gravel... right on the job. The flexibility of grinding with a Marcy permits changing gradation to meet a wide variety of specifications. You get a better product, too... a uniformly cubical product which makes better concrete.

Wet or dry grinding
Sizes: 2' x 6' to 12' x 16'
Capacities: up to 250 tons per hour.



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INDUSTRY NEWS

(Continued from page 45)

Kaiser buys out tile producer

BUSINESS AND ASSETS of the North Hollywood Concrete Tile Co. have been turned over to Kaiser Steel Corp. as the new owners. The transaction gives Kaiser a 7½-acre plant for producing concrete block in the Los Angeles area. Employing more than 70 people, it uses three high-speed block-making machines with automated auxiliary equipment.

Jack J. Ashby, Kaiser Steel president, said that an expansion program now underway will increase the plant's capacity by 75 percent. Block will be produced in 650 shapes, colors and sizes. This operation is expected to absorb large quantities of blast furnace slag generated during the production of steel at the company's Fontana plant. Special equipment will be installed there to expand the slag into high-grade lightweight aggregate.

Under its new ownership, the company will be known as the North Hollywood block division of Kaiser Steel Corporation.

AIME Symposium racks up foreign registrations

HEARTWARMING response to invitations to attend the First International Symposium of Agglomeration in Philadelphia, April 12-14, will bring 85 representatives of 25 foreign countries to the meeting. The event will be sponsored by the American Institute of Mining, Metallurgical and Petroleum Engineers.

William B. Stephenson, Paoli, Pa., general chairman of the Symposium, announced that papers will be presented by authors from the United States and 10 other countries. A wide range of subjects will be covered, including ferrous, non-ferrous, metallic and non-metallic materials. Reprints and abstracts will be furnished to registrants in French and German, as well as English.

Ronald McNaughton, Trail, British Columbia, will assume office as the new president of the Institute when he speaks at the welcoming luncheon at the Sheraton Hotel. He is the manager of metallurgy of the Consolidated Mining & Smelting Co. of Canada, Ltd.

Serving on the program committee as a representative of the cement, lime and gypsum industries, is George C. Lindsay, editorial director of ROCK PRODUCTS.

(Continued on page 52)

AUTOMATED Hydral-60 PINCH VALVE SYSTEMS

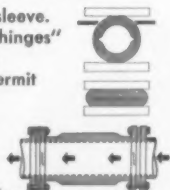


Controlled circuitry for any operating requirements

- The Massco-Grigsby Hydral-60 System consists of one or more pinch valves with a single automatically operated hydraulic pump.
- Hydraulic pump may be operated by electric motor or by air from normal plant supply system.
- Valves may be the same or different size.
- Valves in the system may be operated simultaneously or independently.
- Control valve may be manual or solenoid.
- Valves are self-supporting and may be operated in any position from horizontal to vertical.
- Valves may be coordinated and interlocked with other plant equipment to automatically control tank levels, rate of flow, etc.
- Valves may be independently controlled for normal or rapid closure.
- Valves may be held fully open, fully closed, or at intermediate positions.
- Remote control to meet individual requirements.
- Controls may be included for automatic emergency operation.
- 3" to 14" I.D. sizes, with 50, 100, and 150 psi line pressure ratings.
- Temperatures to 200° F.

Advantages of Massco-Grigsby Pinch Valves

- Rubber, neoprene and special compounded rubber sleeves for corrosive and abrasive pulps and liquids.
- Patented "hinged" sleeve. Recesses serve as "hinges" during compression; reduce strain and permit tight closing.
- Unobstructed flow eliminates high friction loss and prevents contamination.
- Split flanges and patented Flex Seal ends assure perfect seal.
- Rugged, heavy duty construction for most severe service and long life.
- Cannot leak or stick.
- No working parts in contact with pulp or liquid; no packing glands.



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MOUNTAIN-MOVING BELT CONVEYORS IN 12th YEAR WITH ORIGINAL IDLERS

**Barber-Greene conveyor system still going strong after handling
up to 830,000 tons yearly for Blue Ridge Stone Corp.**

The Blue Ridge Stone Corp., Roanoke, Va., is blasting, trucking, crushing and conveying away a limestone mountain at the rate of up to 830,000 tons yearly.

After trucks make the short haul moving blasted rock from face to primary crusher, a 4-flight, 4,150-ft. Barber-Greene conveyor system hustles the limestone from quarry floor to finishing plant.

President Abney Boxley observes, "We've in-

creased production more than 30% over our old all-rail haulage method.

"Since our Barber-Greene conveyors became operative in 1948, we've had 12 years of dependable service with minimum maintenance and downtime. Practically all 1,500 original idlers are still in service and belt life has been extremely good.

"By including a 6,000-ton surge pile ahead of the No. 4 conveyor, we can operate the plant for

6,000-ton surge pile at end of 700-ft. No. 3 conveyor keeps finishing plant operating 24 hours after quarry shut-down. Rock is reclaimed on 1,600-ft. belt leading to finishing plant.





After double reduction of stone in quarry, limestone gets fast ride upgrade on 30" belt of 1,600-ft. Barber-Greene Conveyor enroute to surge pile and then to finishing plant. 4-flight system totals 4,150-ft.

as long as 24 hours after quarry operations have stopped if we bulldoze the stockpile."

Get this same lowest-cost-per-ton-mile solution to your material handling problems by calling your Barber-Greene Conveyor Specialist. He sells pre-engineered and pre-aligned standardized conveyors plus broad design experience . . . a combination that is preferred throughout the aggregate industry for hard-dollar reasons.

Send For New Idler Bulletin

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

Barber-Greene



Main Office and Plant AURORA, ILLINOIS, U. S. A.
Plants in DeKalb, Illinois, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Finishing plant is last processing point for stone after 4,150-ft. conveyor ride from quarry. Short conveyor

loads truck-loading hoppers. Bulk of output is loaded into railroad cars shown on siding.



"We need the latest, most efficient hauling equipment available . . . we believe that with Haulpak, we have it," says Daniel B. Rengier, of J. Robert Bazley, Inc.



"The LeTourneau-Westinghouse 32-ton Haulpak® is the best truck available to handle the hauling of overburden in our strip-mining operations," says Mr. Daniel B. Rengier, Secretary and Purchasing Agent of J. Robert Bazley, Inc., Port Carbon, Pennsylvania, contracting firm. "We need trucks large and rugged

enough to handle the big loads of our 8-yd. shovels — yet the trucks have to be fast and maneuverable enough to do it economically. *Haulpaks are the answer!*



Gives us several extra truck-loads per day

"In order to strip overburden efficiently, the eight-yard shovels must be kept in continuous operation, never held up by trucks that are too small or too slow.

"We estimate that the small turning radius of the Haulpak gains us several truck loads in the course of a day by shortening turning time on each trip by as little as 30 seconds. Another time saver is the powerful 375-hp engine. It enables Haulpak to come out of the pit in a higher gear and at a faster rate of speed than any unit we are familiar with. Those pit inclines may be as great as eight per cent.

"Fast turn-around, plus high hauling speeds, mean that each truck can gain *one complete round trip in every seven* — of course we are speaking of trips of average length. Ours vary from 800 to 2500 feet.



Hydrair* suspension another money saver

"Further savings result from Haulpak's Hydrair suspension system. By leveling the load, it greatly reduces spillage . . . which also cuts road maintenance. In addition, Hydrair increases the life of the tires by distributing the weight of the load *more evenly* over all six tires. Loads on conventional leaf suspension tend to tip and put the weight on only one side of the truck.



Daily average: 2150 yds per unit

"We estimate that five 32-ton Haulpaks can do the work of seven 22-ton trucks like those we have in our fleet, thereby reducing labor costs as well. According to our records, one Haulpak carries a daily average of 2150 yards of overburden in 14 hours — thanks to its speed, maneuverability, capacity and power.



Saw Haulpaks in action

"We chose Haulpak after a trip by three officials of our company, including myself, to an iron ore mine in Utah to see these units in operation," Mr. Rengier continues. "We were impressed with everything we saw, particularly the low center of gravity, the very small turning radius and the Hydrair suspension system.

"The truck's driver demonstrated the effectiveness of this suspension system by rapidly turning the steering wheel from left to right while traveling 24 miles per hour. Ordinarily this type of treatment will start the rear of the truck swinging back and forth, but the Haulpak remained completely stable.

"To bid successfully on contracts for strip mining, we need the latest, most efficient equipment available, and we believe that with Haulpak, we have it!"

We will give you complete information on LW Haulpak — the first all-new truck in a quarter century. Available in 22, 27, 32, 42 and 60-ton sizes. Ask to see our color film, "Revolution on Wheels". You'll see how and why Haulpak moves more tonnage at big savings.

J. Robert Bazley, Inc., works as many as 200 trucks on its road-building and strip-mine operations, and employs up to 800 men. Its president and founder, J. Robert Bazley, has served as American Consultant to the National Coal Board of Great Britain, to design most of Britain's present day open pit mines. Mr. Bazley's grandfather, Nathan Cuyle, designed and patented one of the first power shovels used in open pit mining. The Haulpaks illustrated here are in use at the Pine Forest stripping operation owned by the Reading Anthracite Company and located near St. Clair, Pennsylvania. J. Robert Bazley, Inc., has run the stripping of this coal mine for about 30 years. This is one of three strip mines it works under contract.

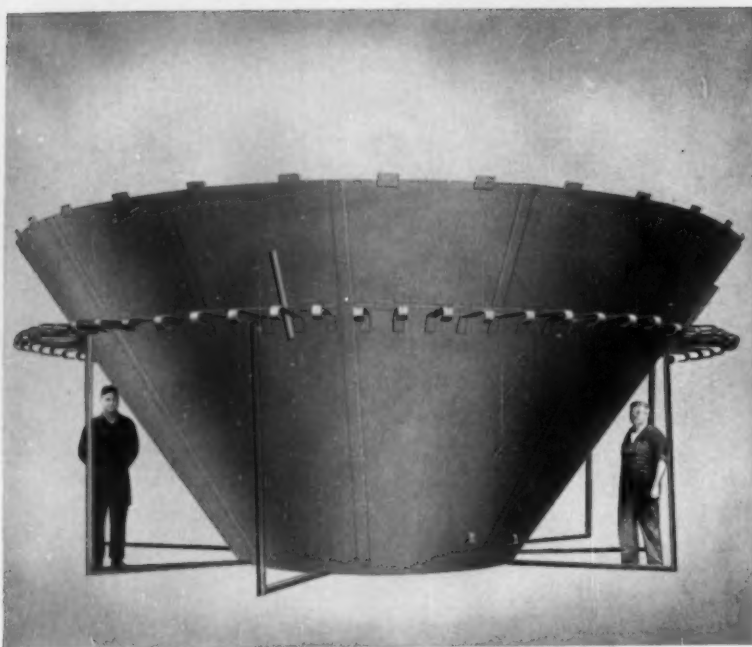
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INDUSTRY NEWS

(Continued from page 47)

Holloway honored for employee communications

NATIONAL RECOGNITION went to Holloway Materials Corp., Winter Park, Fla., for "outstanding achievement in developing among employees a better understanding of business and the American economic system." The company won top award for Class A (under 250 employees) entrants in an awards program originated in 1955 by the Chamber of Commerce of the United States.

Frank Williamson, president of Holloway, and Albert Chubb, personnel manager, attended an awards dinner in Washington, D.C., at which Vice President Richard Nixon was the principal speaker. A silver wreath mounted on a black onyx base was presented to the company. In commenting on its effective use of a variety of communications media, the awards committee said, "A company that believes its principal asset is people, says so and acts so; and Holloway Materials has built its employee communications program on that belief."

Holloway's employee-relations program includes: An employee publication mailed to the home; periodic employee letters explaining business conditions and operations; a 45-page employee handbook setting forth company goals, policies, benefits and philosophies; bulletin boards and pamphlet distribution to increase understanding of business and the national economy; employee departmental meetings (65 in 1959) to stimulate group discussion, and supervisory meetings (46 in 1959) to formulate policies and assure employees receiving the same information in all departments.

Gulf develops new cement mixture

GULF OIL CORP.'s Technical Service Laboratory, Houston, Texas, has developed a new cement mixture for use in drilling through porous formations. It is a high-gel cement containing a high content of clay with special additives to improve its performance. The development is of significant help to the oil industry whose engineers often must drill through formations so porous they dehydrate cements now in use. Such drilling causes the cement to thicken and choke off the space between the wall of the hole and the casing.

(Continued on page 56)

Better products, faster, from your Bower Distributor:



OOF!

It takes a mighty good roller bearing to stand up under this kind of punishment day after day after day. That's why Bower Bearings are *engineered* to take the shock out of rock (or anything you're loading!), and give you equally dependable service over-the-road or off-the-road.

The exclusive Spher-O-Honed design of *tapered* Bower Roller Bearings provides super-finishes of

the ground surfaces of raceways—results in reduced friction, longer service life. *Straight* Bower Roller Bearings feature two-lip construction for improved roller alignment, greater rigidity.

So for bearing replacement, be sure to specify *Bower Roller Bearings*. Your Bower Distributor can give you real hurry-up service on all your bearing needs. Call him today!



BOWER ROLLER BEARINGS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICH.



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VERSATILE TOOL ON SIX

Mobile Michigan releases crawler, yard locomotive for other services at Universal Atlas Cement plant

A rubber-tired 162 hp Tractor Dozer, originally used at this plant to maintain a coal stockpile, has become a versatile production tool on half a dozen typical important dozing tasks.

Owner and operator of the machine, a Michigan Model 180, is the Fairborn, Ohio, plant of the Universal Atlas Cement division of U.S. Steel, New York, N.Y.

In a typical year, their unit dozes

coal, clay, limestone, gypsum and cement clinker at an average rate of more than 300,000 tons. It also moves an average of 1,000 coal gondolas a year, each loaded car weighing 55 to 70 tons. And on many days it travels 15 miles under its own power to help clean up around shovels in the limestone quarry.

Dozes coal at speeds to 10 mph

One of the Michigan's most import-

ant operating traits, according to Universal Atlas plant executives, is its ability to thoroughly mix and remix coal on the stockpile. This is important because coal received from various mines differs in BTU content and must be blended for most efficient burning. They attribute the successful blending to two Michigan advantages. One, the Model 180 dozes at speeds up to 10 miles per hour. Two, its blade design rolls the coal as the Dozer moves forward.

Spontaneous combustion eliminated

Equally important, production men say, is the Michigan's compacting ability on both the coal and clay stockpiles. They haven't had a coal stockpile fire since the 33,750 lb Tractor Dozer was placed in operation, and erosion by both wind and water on the clay stockpile has been effectively reduced.

Tows up to 5 railcars at once

Another task successfully assigned to the Michigan is "muling" coal cars from rail siding to coal shaker dump adjacent to the stockpile. By handling up to five loaded gondolas at a time, it has released a yard locomotive for other plant operations. After each dump, the rig spreads, mixes and compacts the coal in the stockpile, which varies in size up to 400 ft long, 200 ft wide, and 20 ft high. Feeding coal handling equipment for the kilns is also a regular Michigan task. Its production rate here averages 21,000 tons a month.

Stockpiles, compacts clay too

Whenever these coal handling chores permit, the Tractor Dozer is dispatched to work on other stockpiling, or to the quarry. First priority in this type of activity goes to building up clay stock, a task performed entirely by the Michi-



Equipped with coupler, Michigan "mules" both loaded and empty rail cars. Loaded cars weigh up to 70 tons each.



Michigan's big tires compact clay so effectively wind and water erosion have been substantially reduced.

gan. In this operation, the clay, stocked at the rate of 3,500 tons a month, is dozed into place without interruption in any other production area.

Cleans shot rock

A variety of other dozing jobs are done by the machine as well. For example, it cleans up around rock shovels in the quarry. It stockpiles crushed rock. And it works in winter cleaning and shaping the highly-abrasive cement clinker storage pile.

We'll demonstrate for you
We'd welcome the opportunity to

show you how a Michigan Tractor Dozer's versatility, power, speed—and dependability—can increase production on your job. There are four sizes to choose from: 162, 262, 380 and 600 hp. Call us, at your convenience, for a "no-obligation" demonstration on your job.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

2481 Pipestone Road
Benton Harbor 4, Michigan
In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario



COMMON PRODUCTION JOBS

At quarry, Michigan cleans around rock shovels. Unit reaches job, 15 miles from plant, by driving over truck haul roads at speeds up to 20 mph.

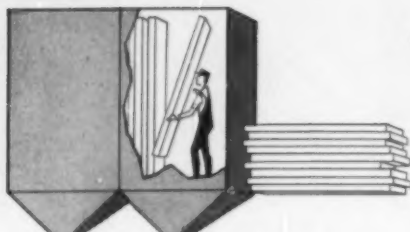




SLY DUST FILTERS

For

ACCESSIBILITY



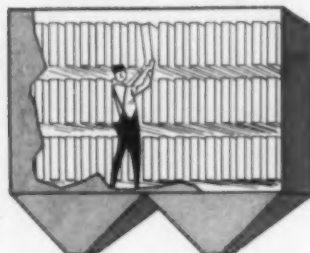
1900's SLY DUST ARRESTER

Every cloth screen from the end of the arrester had to be removed to reach the faulty screen.



1930's SLY TUBE-TYPE FILTER

To replace a tube required at least partial disassembly of every other tube in the way.



TODAY NEW SLY "ROLL-CLEAN" DYNAclone®

Any filter bag is easily accessible and can be replaced without need for removing others.

NEW SLY DYNAclone PROVIDES FASTEST, EASIEST BAG CHANGING

Whether you change one bag, or the entire filter, you do it in less time with the Dynaclone. Quick replacement of individual bags eliminates the need for costly rebagging should only a few be worn. Complete change is also fastest . . . the Dynaclone has only one half as many bags as other filters with the same cloth area. In addition . . .

New "Resist-O-Wear" bags offer 200 to 300% more bag life.

The Dynaclone operates continuously. It provides complete dust suppression through constant suction.

The Dynaclone is automatically self-cleaning by reverse air. A single exhaust fan provides both suction for dust collection and air for bag cleaning. No auxiliary blowers required.

And the Dynaclone provides 20 to 40% more cloth in a given space than other makes of dust filters.

The Dynaclone has been proved in more than 1,000 installations. Investigate its advantages on your applications . . .

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INDUSTRY NEWS

(Continued from page 52)

NCSA schedules convention sessions

SPECIAL SESSIONS will mark each day except the opening one when the 44th Annual Convention of the National Crushed Stone Association convenes in Miami Beach, Fla., January 17-20. First-day events leave both afternoon and evening open for individual plans. Morning and luncheon programs will review the 1960 activities, introduce new officers and present the NCSA Safety Contest Awards.

Wednesday morning sessions for operating men and equipment manufacturers will be held concurrently with a symposium on the salesman's role in the crushed stone industry. A session for executives and finance officers will take the afternoon. Highlight of the day will be a luncheon talk on "Cuba—Island of Crisis," by Jim Buchanan, newspaper correspondent for the Miami Herald. It was he who was accused of espionage while on assignment to Cuba, and tried and sentenced to 14 years imprisonment unless he left the country within 24 hours. He took the latter course and arrived in the States midst a fanfare of headlines.

Concurrent sessions for the morning of the 19th will be for executives and for operating and equipment men. The Manufacturers division will hold a special luncheon for members. "A Night in the Tropics" will furnish the theme for a dinner-dance in the evening for all conventioners and their ladies.

Final adjournment will be at noon on Friday, January 20.

Mining engineers plan for AIME meeting

TECHNICAL SESSIONS on 27 themes are scheduled by the Society of Mining Engineers for the Annual Meeting of the Institute of Mining, Metallurgical and Petroleum Engineers at St. Louis, Mo., February 26-March 2.

The Society, a constituent organization of AIME, is composed of four divisions in the mining field. Sessions scheduled for each include one for the Industrial Minerals Division on the subject of Transportation of the Bulky Minerals. George C. Lindsay, editorial director of ROCK PRODUCTS, is on the program committee for this session as chairman of the cement, lime and gypsum section.

New officers and directors of SME

(Continued on page 60)



IN 31 YEARS OF EXPERIENCE—



AMBRAW GRAVEL COMPANY

Producers of
HIGH GRADE SAND and GRAVEL
The Oldest Sand and Gravel Company in this Territory
ORAN S. CALVERT, Owner

LAWRENCEVILLE, ILLINOIS
September 23, 1960

Thomas Foundries
P. O. Box 1111
Birmingham 1, Alabama

Attention: Mr. Joe Keeton

Dear Sir:

We have been in the gravel business for thirty-one years with plants located along the Wabash River. The deposits in this area have the reputation of being as abrasive as in any place in the United States and our market is very competitive.

Prior to 1957, we had been using the best manganese-fitted 8" pump, but our costs were rising so sharply by using this equipment that we had to do something to decrease these costs. So my Superintendent, Mr. Russell McClaskey, and I decided to try an 8" Thomas Pump, installing it in July, 1957. After three years' running this pump, we are delighted with its economy in operation. We find that the parts which come into contact with abrasive materials are giving us over three times the wear we were getting formerly, at about the same cost per unit for replacement, thus cutting our cost and "down time" to about one-fourth of what it was previously.

Our decision to buy the Thomas Pump has proved to be the wisest decision we have ever made, and we believe that there are more Thomas Pumps working in our area per square mile than in any other area within our knowledge.

Both Mr. McClaskey and I send our best regards.

Yours very truly,

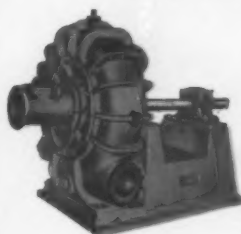
AMBRAW GRAVEL COMPANY
Oran S. Calvert



Left: Oran S. Calvert, Owner.
Below: Russell McClaskey, Supt.

He Says Purchase of THOMAS PUMP WISEST DECISION

he ever
made!



Famous in song and story for half a century, Wabash River country now produces a ringing testimonial for Thomas DURABLE Dredge pumps. Mr. Calvert's Thomas pump is a Series HL, 10" Suction, 8" RH Bottom Discharge, (illustrated above). It is one of many installations of Thomas pumps in southern Illinois and southern Indiana during the past several years, most of them along the Wabash River.

Mr. Calvert states that his three years experience shows that his Thomas pump has cut his maintenance and down-time cost 75%! Does

he know what he's talking about? Well, he has 31 years experience in the sand and gravel business!

AND — many other Thomas pump users "on the banks of the Wabash, far away," are saying: "You can not buy at any price a more durable pump for sand and gravel. You can not buy another pump that will make you as much money."

Thomas Durable Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Write or phone for additional information.



THOMAS FOUNDRIES Inc.
P. O. BOX 1111, BIRMINGHAM, ALABAMA



A NEW-TYPE BAG!

BEMIS "RIDGLOK"

Trademark

REDUCES TRANSIT

This is important news for the rock products industry...

The new Bemis RidgLoc-Extensibles, in which two types of extensible kraft are combined, have shown, in major tests conducted with two cement companies, only 50% as much breakage in transit as conventional extensible multiwalls, heretofore proved the most practical, economical cement bag.

WHAT'S NEW?

**CLINGS LIKE A GLOVE...
RESISTS SLIDING...**



The ridged, embossed outer ply of extensible kraft (really extensible in both directions) clings like a glove... resists sliding or movement in transit, so breakage is greatly reduced.

**STIFFER BAG...
EASIER TO HANDLE...**



Still another benefit: The embossed outer ply of Bemis RidgLoc makes the bag stiffer... and the stiffer valve corner makes it easier to handle at the packing machine.

EXTENSIBLE MULTIWALL BREAKAGE 50%

SMOOTH INNER PLIES...

Inner plies are the regular type extensible kraft which Bemis pioneered in multiwalls. They resist shock and breakage...and the smooth surface releases contents of the bag fast and cleanly.

The different types of paper in Bemis RidgLok Multiwalls come from different paper makers. Bemis can give you improved bags like RidgLok because we have a range of paper supply.

Ask your Bemis Man for the complete RidgLok-Extensible story ... you'll want the details.

BEMIS *where flexible packaging ideas are born*

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INDUSTRY NEWS

(Continued from page 56)

will be installed during the AIME convention. President for 1961 will be James C. Gray, Pittsburgh, administrative vice president of raw materials, U. S. Steel Corp. Vice president of the Eastern Region for the next three years will be Edward G. Fox, Washington, D.C., president of Bituminous Coal Operators Association.

Directors, also for three-year terms, will be Dennis L. McElroy, Pittsburgh, executive vice president of Consoli-

dation Coal Co., to represent the Coal div.; Raymond H. Feierabend, Port Sulphur, La., assistant vice president of Freeport Sulphur Co., to represent the Industrial Minerals div., and Wayne L. Dowdey, Birmingham, Ala., regional manager, The Eimco Corp., to represent the Minerals Beneficiation div. Two directors who will represent the Mining and Exploration div. are Alfred D. Rood, New York City, assistant to the vice president of Andeas Copper Mining Co. and Chile Exploration Co. (subsidiaries of Anaconda Co.) and Frederick S. Turneure, Ann Arbor, Mich., professor of geology at the University of Michigan.

The three divisions of SME, AIME, plan 20 sessions, most of which will contain discussion of subjects that are highly important to every operator in our industry. A complete program with abstracts of individual papers to be given is included in the December 1960 issue of Mining Engineering, AIME's official publication. Here's a brief summary of the program:

INDUSTRIAL MINERALS DIV.

Mineral Aggregates—9:30 a.m., Feb. 27,

C. E. Golson, Chairman

Foreign Trade Aspects of Fillers, Fibers & Pigments—2:30 p.m., Feb. 27, H. L. King, Chairman

Industrial Waters—9:00 a.m., Feb. 28, R. J. Kazmann, Chairman

Conflicting Interests in Exploitation of Industrial Minerals—9:00 a.m., March 1, R. J. Lund, Leon M. Dupuy, Co-Chairmen

Raw Materials for Chemical Industries in the Midwest—2:00 p.m., March 1, W. M. Zilbersher, Chairman

Transportation of the Bulky Industrial Minerals—9:00 a.m., March 2, Paul H. Hedley, Chairman

MINERALS BENEFICIATION DIV.

Crushing & Grinding—9:30 a.m., Feb. 27,

F. J. Windolph, J. H. Brown, Co-Chairmen

Concentration—2:30 p.m., Feb. 27, E. C. Tveter, J. R. Moore, Co-Chairmen

Chemical Process—9:00 a.m., Feb. 28, F. T. Davis, S. Power Warren, Co-Chairmen

Basic Symposium on Kinetics & Design—9:00 a.m., 2:00 p.m., 5:00 p.m., March 1, P. L. de Bruyn, R. J. Charles, Co-Chairmen respectively

Materials Handling & Mill Design—9-12 a.m., 2-5 p.m., March 1, A.A. Wallach, D. G. Ashe, D. O. Carlson, E. J. O'Connell, Co-Chairmen

Solid Fuel Separation—9:00 a.m., March 2, Clyde Osborn, Dale Mathews, Co-Chairmen respectively

Operating Control—2:00 p.m., March 2, H. E. Uhland, J. T. Lawver, Co-Chairmen

Pyrolysis and Agglomeration—2:00 p.m., March 2, Harold E. Rowen, W. F. Stowasser, Co-Chairmen

MINING & EXPLORATION DIV.

Open Pit Mining—9:30 a.m., Feb. 27, Hugh J. Leach, Marvin E. Johnson, Co-Chairmen

Underground Mining—2:30 p.m., Feb. 27, John J. Reed, C. David Mann, Co-Chairmen

Research Symposium—9:00 a.m., Feb. 28, C. H. Burgess, Chairman

Geology—9:00 a.m., March 1, M. L. Jensen, J. D. Forrester, Co-Chairmen

Geochemical—9:00 a.m., March 2, Douglas R. Cook, Chairman

Geophysics for the Geologist & Engineer—2:00 p.m., March 2, Don A. Hansen, Chairman

In addition, the Council of Economics plans a full session on Percentage Depletion, which will be held at 9:00 a.m., March 1; C. W. Merrill, Jr., and J. D. Vanderwilt will co-chairman this session.

Guest speaker at the SME dinner on Tuesday, Feb. 28, is Curtis L. Wilson, dean of the Missouri School of Mines and Metallurgy and director of the State Mining Experiment Station.

(Continued on page 65)

JOB REPORT

FEEDING GRAVEL PLANT HOPPERS



"At our plant in Amagansett, New York, this Cat D7 with Balderson BD7U dozer is producing at least 90 cubic yards per hour on a 400 foot push. I really like the "U" blade. It's doing at least 50% more than a D7 with a straight blade. I doubt if I'll buy any more straight bulldozers now that I've seen what a "U" blade will do."

Pete Bistran
Bistran Gravel Plant
Amagansett, New York

BALDERSON
WAMEGO KANSAS

INC.
U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Please send me more information on teaming Balderson U-blades with Caterpillar machines. I am mainly interested in a Balderson U-blade for a Cat _____ (model) for _____ (use)

NAME _____
ADDRESS _____
CITY _____ STATE _____

Enter 1430 on Reader Card

ROCK PRODUCTS, January, 1961

Enter 1431 on Reader Card



Report from Bishop Sand and Gravel Co.—Mitchellville, Iowa

"OUR NEW 977H IS DOING A BETTER AND FASTER JOB THAN ANY OTHER MACHINE WE COULD HAVE USED..."

"One of the reasons we get such good production is the power shift transmission. I think it's one of the best improvements ever put on a machine."

I. J. Bishop, Owner

The Bishop Company produces 1000 tons of sand and gravel a day. Their 977H excavates the gravel, feeds the screening plant and loads trucks. Occasionally, it's used for building levees, stripping overburden and general utility jobs.

This new 977H Traxcavator is a 2½ yd., 150 HP, tough, reliable machine that can handle about any excavation-loading job that comes along. It's designed to set a faster production pace than the model it replaces (and other makes of comparable size). With power shift transmission and live action hydraulics, it's the Traxcavator that never stops. It can take the roughest kind of work in stone quarries and gravel pits—move as much as 3 to 4 thousand tons a day.

Also built for tough pit and quarry work is the 955H—a 100 HP machine with 1¾ cu. yd. bucket and the same advanced features as the larger 977H.

Why not call your Caterpillar Dealer and arrange a demonstration? Put these machines against those you are now using and watch the difference.

NEW POWER SHIFT TRANSMISSION—one lever gives split-second changes in speed or direction to slash cycle time.

NEW LIVE ACTION HYDRAULICS provide faster lifting speed and greater lifting capacity without robbing power from tracks. The 977H packs 41% more hydraulic lifting force—955H, 37% more than former models.

NEW HEAVY-DUTY UNDERCARRIAGE has big D7 size track components, triple grouser shoes, life-time lubricated rollers that need no servicing until rebuilding. Track guiding guards are welded to the roller frame for positive track alignment.

NEW DRY-TYPE AIR CLEANER removes 99.8% of all dirt from intake air even in worst dust conditions—cuts maintenance time as much as 75%.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

**TRAXCAVATORS
ARE MAKING OTHER
LOADERS OBSOLETE**

Save on construction costs with the new '61 FORD TRUCKS

FORD HEAVIES SAVE WITH DOUBLE THE CAB, SHEET METAL AND RADIATOR LIFE

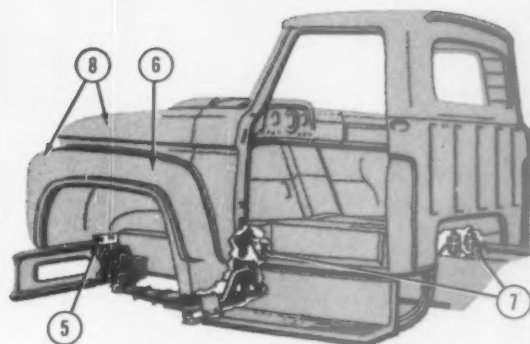
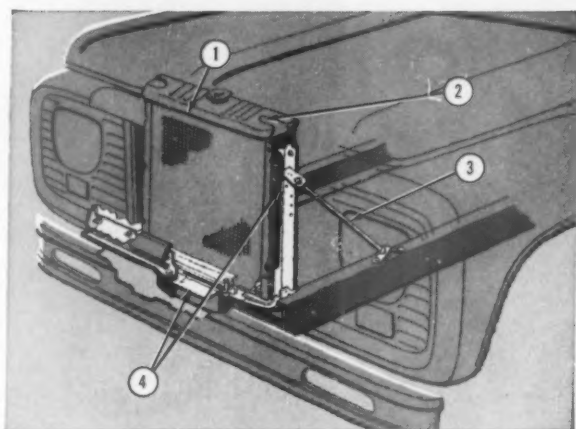
Ford F-Series Heavy Duty models are especially designed for the rugged terrain and tough conditions generally found on construction jobs. Their new independent mounting system for cab and radiator effectively separates both from adjacent sheet metal assemblies for much greater durability. And radius rod-leaf type rear springs provide better axle alignment, a smoother ride and longer spring life.

The electrical wiring system has been improved for greater reliability. Chassis wiring is fastened within the protection of the frame web, away from mud, ice and snow. And Ford Truck frames have been engineered to make the mounting of bodies and special equipment easier. A new 212-inch wheelbase model is available to accommodate extra-long bodies.

Save with Ford T-Series Heavy Duty Tandems for exceptional durability, big payloads and low operating expenses. Ford T-700, T-750 and T-800 Tandems have rugged double-channel frames that are built to take tortuous off-road treatment. And they provide a wider range of chassis options so you can choose the right power train and load-carrying components for any job. Eaton and Timken rear axles are now available in bogie assemblies with 22,000-, 28,000-, 30,000- and 34,000-lb. capacities. And lightweight aluminum walking beams, wheels and gas tanks are available to keep chassis weights low . . . payloads high.

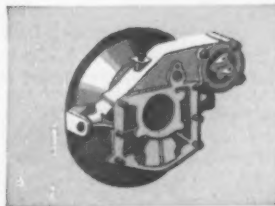
Ask your Ford Dealer about Ford's full tandem line . . . including Super Duties with 38,000-lb. bogies for up to 51,000-lb. GVW!





- ① **Save with Ford's exclusive "lock-seam" radiator construction** that doubles the solder area at key seams for greatly increased strength and longer radiator life.
- ② **Save with heavier-gauge metal on radiator tank and header.** Tanks and header have thicker walls to resist vibration, jolts and corrosion for greater reliability.
- ③ **Save with independent radiator mountings,** separate from front-end sheet metal. This means that road shocks and shakes are not transmitted to the radiator through sheet metal . . . tanks, tubes and connections last longer, require less maintenance.
- ④ **Save with "horse collar" mounting** for extended radiator life. This new mounting on resilient rubber at the center of frame cross member soaks up any frame flexing . . . cuts wear and tear on entire cooling system.
- ⑤ **Save with independent fender mountings.** Fenders are bolted to a rubber-cushioned transverse bracket at the front and a frame-mounted bracket at the rear. This mounting, independent of both cab and radiator, eliminates stress transfers for increased fender life.

- ⑥ **Save with removable fenders.** The quick and easy removal of only 8 bolts per fender provides faster service accessibility to the engine area, saving valuable maintenance time.
- ⑦ **Save with new 3-point cab mounting system** for greater cab durability. Two outboard front mounts plus a centered "twin" rear mount provide a triangular system that holds the cab stationary while allowing the frame to move independently . . . reducing strain on the cab.
- ⑧ **Save with 42% heavier-gauge sheet metal** in fenders, hood, cab floor pan and toeboard for greater strength, greater durability.



Save with Ford's new Full-Torque flywheel power take-off . . . now available on T-750's and up, to power construction equipment like transit mixers. It's much simpler and more efficient than long, complicated hookups needed with the front-end drives. And the flywheel PTO is lighter in weight—only 105 pounds—for greater payloads.

FORD TRUCKS COST LESS

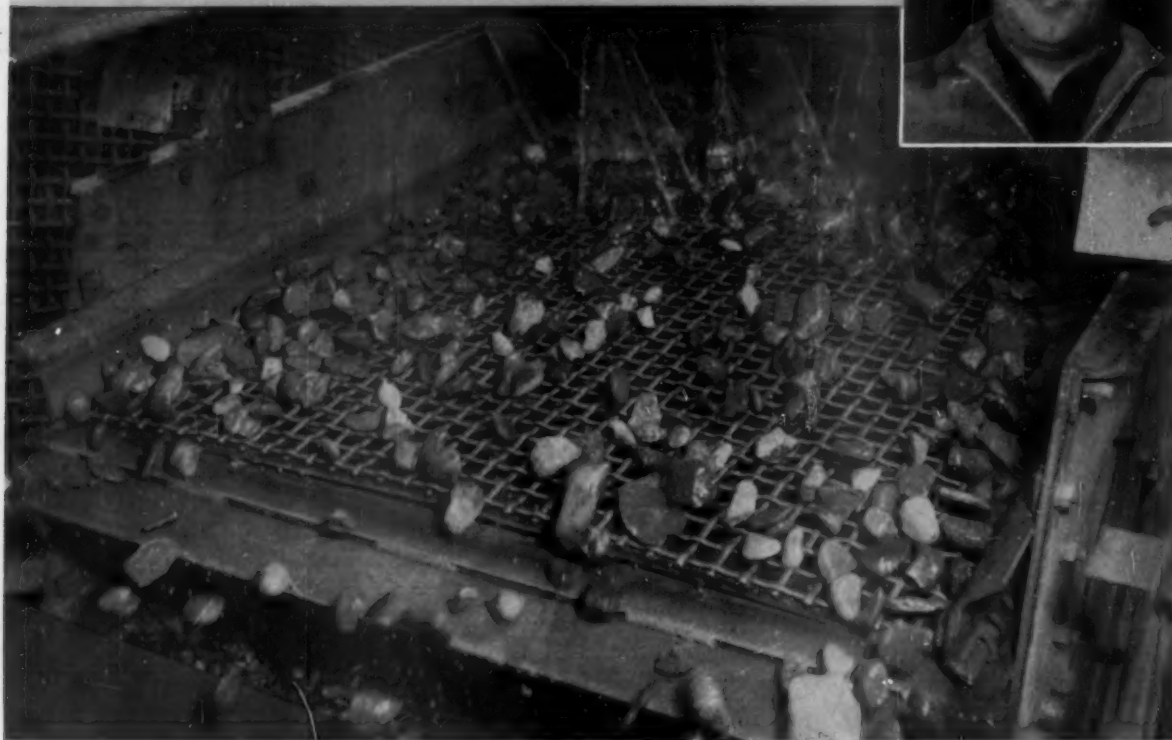
YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, *Ford Motor Company*



**"Our screening efficiency has
jumped 25% with
SECO Twin Bearing SCREENS"**

says Bill Estell, Vice President, TOWANDA SAND & GRAVEL CO., INC., TOWANDA, PA.



"In the past year and a half, since putting SECO Twin Bearing SCREENS on the job, our production capacity has increased so much that we had to open up the feed to take the increased loads. And during this time, there has not been a single minute of downtime.

"As a matter of fact . . . we have been able to ADD to our production time because we don't have to shut down at lunch time any more for greasing bearings, thanks to the oil bath lubrication of the bearings in our SECO Twin Bearing SCREENS. Believe me, SECO is what I call the 'Cadillac of vibrating screens'".

You'll certainly agree with Mr. Estell when you put SECO Twin Bearing SCREENS in your plant for less downtime, greater efficiency, top tonnages and greater profits!

Send TODAY for Twin Bearing
Booklet TB-21

SCREEN EQUIPMENT CO., INC.
BUFFALO 25, N. Y.

Manufacturers of vibrating screens EXCLUSIVELY for
over a quarter of a century.

SECO



**"TIME CONSCIOUS"
VIBRATING SCREENS**

Enter 1451 on Reader Card

INDUSTRY NEWS

(Continued from page 60)

Articles of incorporation

OKLAHOMA-TULSA SAND CO., Inc. has been granted a charter to incorporate after 50-years' existence. William J. Doyle Jr., Sue C. Doyle and William J. Doyle III, all of Tulsa, Okla., are the corporate members. Capital stock: \$75,000.

DANIELS STONE CO., Inc., Topeka, Kansas, has been chartered for quarrying. James R. Dobbs was named resident agent. Capitalization was authorized at \$25,000.

ALASKA PORTLAND CEMENT, Ltd. filed incorporation papers recently at Petaluma, Calif., listing \$300,000 capitalization to engage in the business of mining, processing, manufacturing and selling of limestone, cement and other building materials. Incorporators: James W. Combs, Fred H. and Allan H. Seaman (all of Pasadena); O. E. Loring Jr., Cotati; Milton A. Crabtree, Mill Valley; William E. Lewis, Ukiah, and Emil Usibelli, St. Helena.

SIERRA SUNSET QUARRIES, Sausalito, Calif., filed articles of incorporation with \$200,000 capitalization for the quarrying and sale of building rocks and roofing granules. Incorporators: Raymond and Mary Early, San Francisco, and Arthur D. Fearon, Sausalito, California.

B & R SAND & GRAVEL CO., Inc., with headquarters in Phoenix, Ariz., has filed articles of incorporation listing \$250,000 authorized capitalization. Incorporators: J. E. Brown and Jess Rosas, Ashfork, Ariz. Neil V. Christensen of Flagstaff is lawful agent.

COACHELLA VALLEY Rock & Sand Co. filed articles of incorporation to engage in rock and sand processing in Riverside County, Calif. Capital stock: \$500,000. Incorporators: Jack H. Hicks and Velma Jean Hicks, Indio, and Roy E. Allred, Rancho Mirage.

CONSOLIDATED ROCK & SAND Co., Inc., with principal offices in Mesa, Ariz., has filed articles of incorporation listing \$1.5 million authorized capitalization to engage in the unlimited sale of ready-mix concrete, sand, gravel, asphalt and mortar; and in the unlimited production of same. Incorporators: Robert W. Evans, Elizabeth J. Evans, Edgar J. Cyr, G. E. Cyr.

LONG SILO & BLOCK CO., Inc., Shelbyville, Ky., listed \$200,000 capitalization to deal in silos and concrete products. Incorporators: Tyler and Henry Long.

ROBERTS ROCK & SILICA SAND Corp., Los Angeles, Calif., listed capital stock of \$100,000 to engage in silica sand production. Incorporators: John Allison Roberts and Eleanor Louise Roberts, Santa Maria, and Norma Moran, Los Angeles.

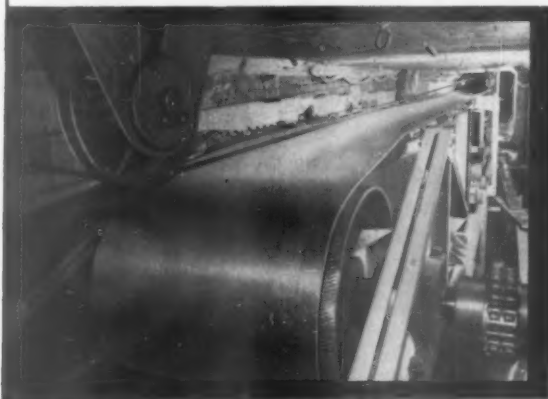
Woodville firm builds new plant

COMPLETION OF A NEW PLANT at Woodville, Ohio, will be late in 1961, according to estimates of the Standard Lime & Cement Co. The new facility is being constructed on a tract adjoining the company's existing plant which will eventually be razed. It will house three new-type rotary kilns, refractory burning equipment and machinery for crushing, screening and stockpiling dolomite.

The company—a subsidiary of American-Marietta Co.—processes dolomite into a catalyst used in steel making, and into dolomite lime.

(Continued on page 68)

MOVING A MOUNT INTO SEA

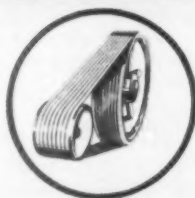


WORLD'S FIRST CONVEYOR BELTS UNDER CITY

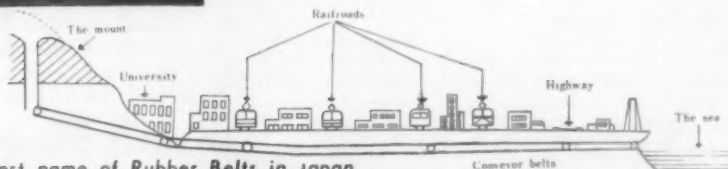
In answer to the steadily increasing demand for expansion of the seaside industrial area in Japan, the municipal authorities of Kobe, known for its attractive harbour, began their new project of reclaiming the eastern foreshore of the city. That is, they decided to carry granite sand, scraped from the top of a mount 2.3 miles distant, through a special underground tunnel by means of a series of conveyor belts instead of using dump-trucks—very dangerous to drive on busy streets. When the project is completed, a volume of 494.4 million cubic feet of sand from the mount will produce 1.39 million acres of land along the present foreshore.

The entire operation will be handled through the effectiveness of **BANDO** conveyor belts.

The conveyor belt tunnels under four railroads and a highway.



BANROPE



The greatest name of Rubber Belts in Japan

BANDO RUBBER MFG. CO., LTD.

1, 2-CHOME, MEIWA-DORI, HYOGO-KU, KOBE, JAPAN

Straight talk

on shovel-crane controls



ONLY ONE SHOVEL-CRANE MAKER FULLY UTILIZES TRUE POWER-HYDRAULIC CONTROLS

Until recently, other shovel-crane builders completely ignored power-hydraulic controls, or were content to merely augment their outdated mechanical controls with booster-type systems — so-called “power” controls. Only in the last few years have some of these manufacturers begun to offer a power-hydraulic control, *though strictly on a limited basis . . . not on all models and not for all machine functions. Some machines even employ 3 different control systems.*

Now look at Link-Belt Speeder. The company first pioneered power-hydraulic controls for shovel-cranes in 1936, 25 years ago. Then, in 1954, Link-Belt Speeder made this modern, proven Speed-o-Matic system standard on every machine in its wide line. Today, the controls are used for every machine function . . . *are the same on each and every rig.*

JUST NUDGE THE LEVER

The years-ahead Speed-o-Matic system employs the instantaneous force of oil under pressure — all the way from the control levers to the operating clutches. And, since oil is noncompressible, clutches respond the instant additional pressure is metered into the clutch lines. Absolutely no wait for pressure to build up.

Short-throw Speed-o-Matic control levers are panel-mounted for operator convenience and ease. By simply nudging one or more of these levers, a crane operator, for example, can boom up or down, hoist or lower a load, swing, travel . . . independently or in suitable

combinations. And every machine response is **instantaneous, oil-smooth, precise!**

For example, on a machine equipped with reversing clutch (or clutches) on the operating drums, the Speed-o-Matic operator can power down the heaviest or lightest loads with hairline accuracy. Fingertip-sensitive control levers provide exact in-hand feel of the load.

AIR CONTROLS TEND TO LAG

How many manufacturers actually *recommend* air controls for crane work . . . especially on the swing . . . or on the hoist, for that matter? Waiting for pressure to build up can be serious business, resulting in a dangerous lag. The operator cannot expect the same degree of precision and safety as with instantly responsive power hydraulics.

With the Speed-o-Matic system, hydraulic lines are constantly full of oil, permitting the operator to meter the desired pressure to the various clutches without the hazards of waiting for build-up. For *more pressure*, he merely eases the lever forward (or reverse). To *release*, he returns the lever to neutral.

AIR CONTROLS DEMAND EXTRA SERVICE

Air controls, for one, present their share of servicing headaches. Dirt and moisture prove a major worry . . . not to mention freezing, filter maintenance and other downtime annoyances. And most components of these systems are purchased from outside sources.

The Speed-o-Matic system, on the other hand, is

unaffected by normal changes in temperature or atmosphere, and requires only seasonal oil changes. It's an open system, *with no need to prime or bleed*. Basically it's the same reliable system used on aircraft. And all components of this modern system (except pump) are designed and manufactured by Link-Belt Speeder.

POWER-ASSISTED CONTROLS FALL SHORT

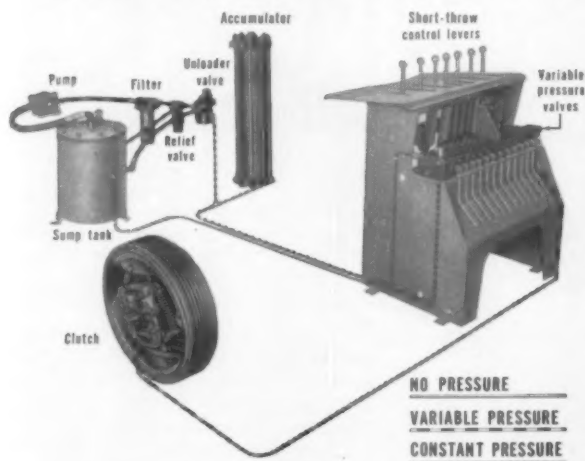
Manual hydraulic, air or mechanical booster systems offer a power assist to just a limited number of shovel-crane functions . . . **not all operations**, as with Speed-o-Matic. On some machines, to illustrate this point, only the main operating drums benefit from power controls, and on some mechanical booster systems, it is recommended that the booster be disengaged for crane work.

MECHANICAL CONTROLS DEPEND ON MUSCLE

Obsolete long-lever controls, of course, enjoy no power assist whatsoever. Still used on small machines, they are bulky and slow; they hand-fight the operator, contribute to his fatigue, hold down his production . . . require frequent adjusting. They simply do not compare to power controls.

SPEED-O-MATIC POWER-HYDRAULIC SYSTEM LETS OIL UNDER PRESSURE DO THE WORK

By means of variable pressure control valves, the operator meters oil pressure to each operating clutch. For more pressure, he lengthens the stroke of the lever to increase the force of the spring. This, in turn, moves the piston to admit more oil from the



valve bank. Response is prompt, positive and smooth. Pressure at the valve bank is kept constant (between 900 and 1050 psi) by the system's accumulator, which explains why the engine-driven pump operates against pressure only 5% of the time.

CLUTCHES SELF-ADJUSTING

Speed-o-Matic eliminates more than 150 working parts. There are no bushings, pins, links, clutch toggles. All actuating mechanism is oil-immersed. A micronic-type, replaceable oil filter keeps oil clean.

Interchangeable Speed-o-Matic clutches require far less operator attention. Even minor adjustments are spread weeks or months apart. Why? Hydraulic-actuated pistons automatically compensate for normal lining wear, heat expansion or temperature changes.



SPEED-O-MATIC POWER HYDRAULIC CONTROLS MAKE EVERY JOB EASIER! This Link-Belt Speeder LS-98 shovel-crane with clamshell attachment features instantaneous, oil-smooth, precise command of every machine operation. Short-throw Speed-o-Matic control levers save the operator from end-of-shift fatigue, help boost his production.

PERFORMANCE AND PROFITS—A LONG-RANGE LOOK

Today, shovel-crane buyers simply cannot afford to relegate machine controls to secondary importance . . . cannot afford to buy experiments. A less efficient control system can penalize a rig in performance and profits for years to come.

See your local Link-Belt Speeder distributor for details, or write for illustrated literature. **LINK-BELT SPEEDER CORPORATION**, Cedar Rapids, Iowa.

168-60H

1936 - 1961 . . . 25th ANNIVERSARY OF SPEED-O-MATIC CONTROLS

LINK-BELT SPEEDER



21 crawlers

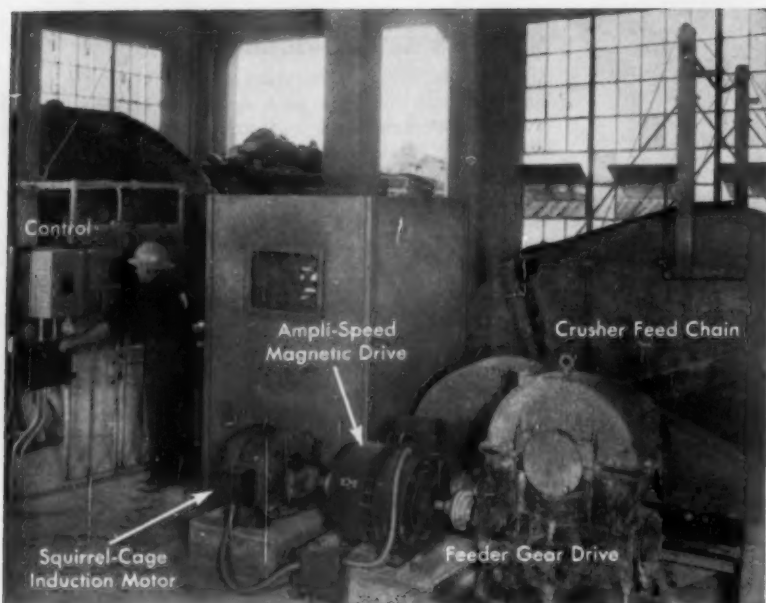
6 truck cranes

4 self-propelled

It's time to compare . . . with Link-Belt Speeder

Enter 1469 on Reader Card

ROCK PRODUCTS, January, 1961



CEMENT COMPANY STEPS UP CRUSHER OUTPUT 10%

Stops overloading by automating feeders with E-M AMPLI-SPEEDS

PROBLEM: "How to keep hammermill crushers fully loaded without overloading?" That was the problem facing operators of a large midwest cement plant.

Crushers were severely overloaded when heavy concentrations of rock were loaded onto the traveling feed chains a carload at a time. And to make matters worse, the steadily moving feeders kept right on feeding the already overloaded crushers. Yet, in between carloads the crushers were underloaded because the wound-rotor motors driving the feed chains were kept at their lowest speed to minimize overloading.

SOLUTION: Mill engineers replaced the wound-rotor motors with 20 hp, 1750 rpm squirrel cage induction motors they had in stock and installed E-M Ampli-Speed Magnetic Drives between the motors and the feeder gear drives. Simple control

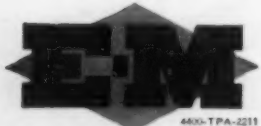
circuits were devised by putting a current transformer in each crusher motor power circuit and feeding its output through a rectifier to the Ampli-Speed Control.

RESULT: Now when crushers start to overload, motor line current signals the Ampli-Speed to stop the feeder. When the threatened overload passes, crusher motor line current drops and the feeder moves forward. This automatic start-stop action of the E-M Ampli-Speeds keeps the crushers fully loaded but never overloaded. Time saved between carloads by the increased speed of the feed chains has stepped up output 10%.

Do you have a speed control problem? ... Ask your nearby E-M speed control expert for help. He will be glad to give you details about precise, adjustable control with Ampli-Speed. Also, write the factory today for Bulletin No. 1140-RP.

Somewhere in your plant an operation can be improved with smooth, adjustable speed control...

DO IT YOURSELF WITH AMPLI-SPEED



Enter 1433 on Reader Card

**ELECTRIC MACHINERY
MFG. COMPANY**

Minneapolis 13, Minnesota

INDUSTRY NEWS

(Continued from page 65)

Phoenix Cement first to win Green Cross safety award

TOUTING for seat belts as part of an extensive safety program brought Phoenix Cement Co. special recognition from the National Safety Council. As the first industrial organization in Arizona to adopt the Seat Belt Safety Program, the company not only installed the items in its fleet of 17 trucks and 14 automobiles, but it also indoctrinated employees in both the Phoenix and Clarkdale plants into using them for private vehicles. By the end of the year, 162 had already installed double belts in their cars.

Governor Paul Fannin attended the ceremony that included presentation of Certificate Number 1 to Ray R. Adams, president of Phoenix. In a speech congratulating the company and its employees, the governor said,



GOVERNOR of Arizona, Paul Fannin (shown left), congratulates Ray R. Adams, Phoenix president (holding award), on winning the Green Cross recognition for seat belt safety. Looking on is vice president Herb Lindner of the Maricopa County Chapter of the National Safety Council.

"If we are going to advocate safety for others, we certainly should practice the same principle ourselves. Consequently, I have recommended to our State Departments that they also equip their cars with safety belts."

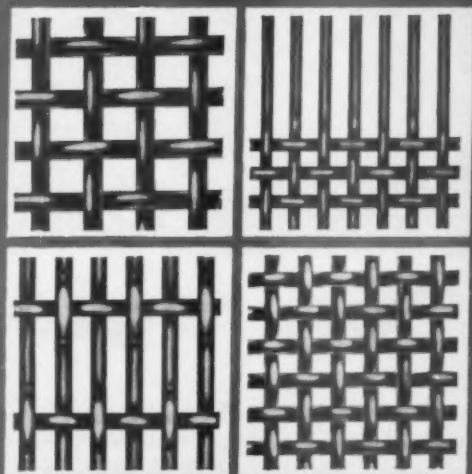
Phoenix implemented its program with posters, pamphlets and departmental meetings. It was climaxed last fall by a mass meeting at the Clarkdale plant during which Scott Wallace, managing director of the Maricopa County Green Cross Chapter, presented films and demonstrations on the use of safety belts.

Don L. Rogers, personnel director of Phoenix, stressed the fact that the Injury Research Department of Cornell University had discovered that a person involved in an automobile accident who is wearing a seat belt is 60 percent less likely to receive an injury of any kind and 50 percent less likely to be killed.

(Continued on page 73)

**MORE
DURABLE
ACCURATE
ECONOMICAL**

"YOU GET MORE"... Super-tough, hard and ductile alloyed wire—tightly, rigidly woven with extreme accuracy into screens unequalled for resistance to abrasion, distortion and fatigue. Precision-formed hook strips, applied over wire edges sheared absolutely square, insure easier installation under maximum tension to prevent excessive wear and breakage. Flat, buckle-free L-S Screens increase speed of feed, reduce recirculating loads, boost output, improve product quality. Get more for your money—be sure the screens you buy are Ludlow-Saylor.



**LUDLOW
-SAYLOR**
WOVEN WIRE SCREENS

LUDLOW-SAYLOR WIRE CLOTH COMPANY
4339 WEST CLAYTON AVE.
ST. LOUIS 10, MO.

BIRMINGHAM 512 N. 18th St.
CHICAGO 6761 West Grand Ave.
DENVER 1530 Carr St.
HOUSTON 5638 Harvey Wilson Dr.
PITTSBURGH Union Trust Bldg.

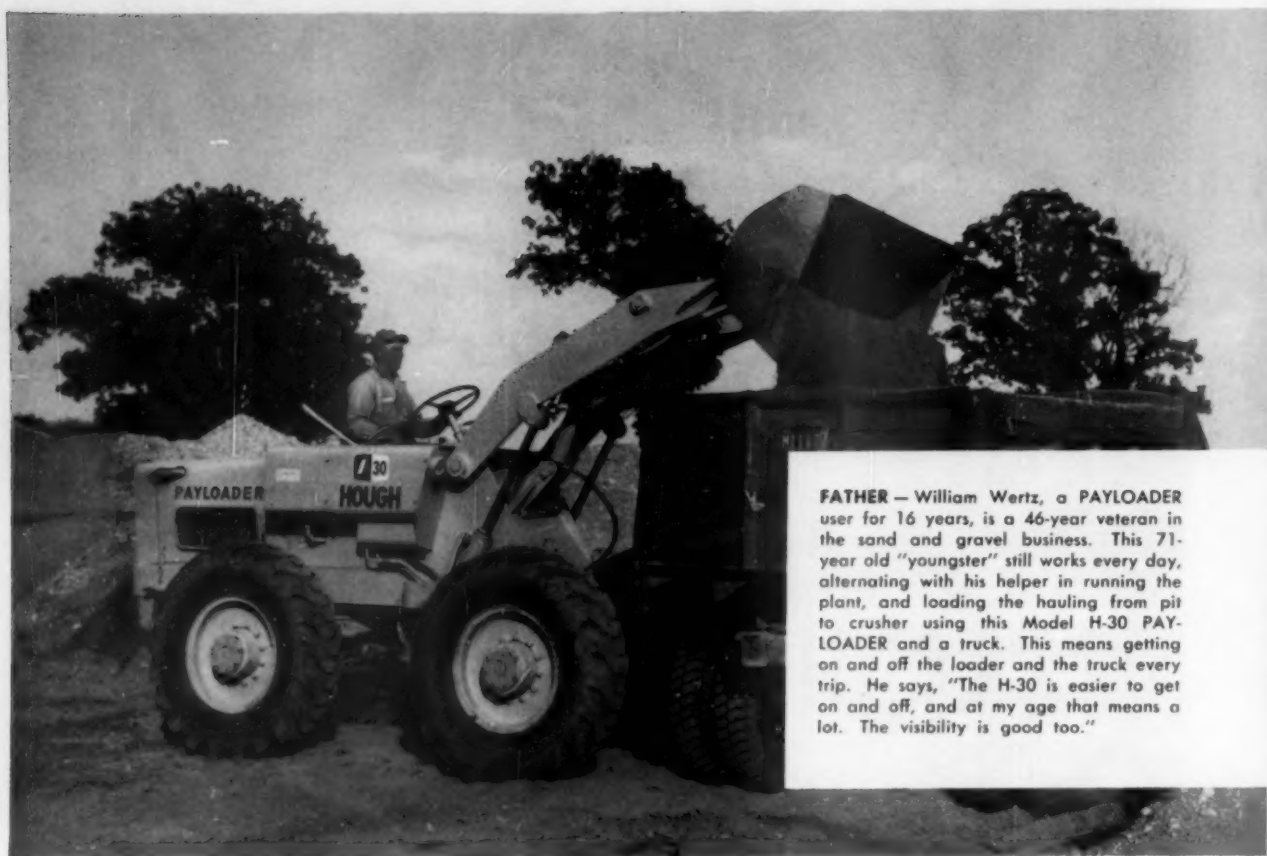
CALIFORNIA Star Wire Screen & Iron Works, Inc.
(L-S Subsidiary) Sunset Ave. & Valley Blvd.
City of Industry (L. A. County)

IMMEDIATE DELIVERY

— most weaves and sizes

Write for NEW Catalog 104

Ludlow-Saylor Screens and Wire Cloth can be furnished in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless or other alloys; Monel, bronze, copper, brass and most other metals that can be drawn into wire.



FATHER — William Wertz, a PAYLOADER user for 16 years, is a 46-year veteran in the sand and gravel business. This 71-year old "youngster" still works every day, alternating with his helper in running the plant, and loading the hauling from pit to crusher using this Model H-30 PAYLOADER and a truck. This means getting on and off the loader and the truck every trip. He says, "The H-30 is easier to get on and off, and at my age that means a lot. The visibility is good too."

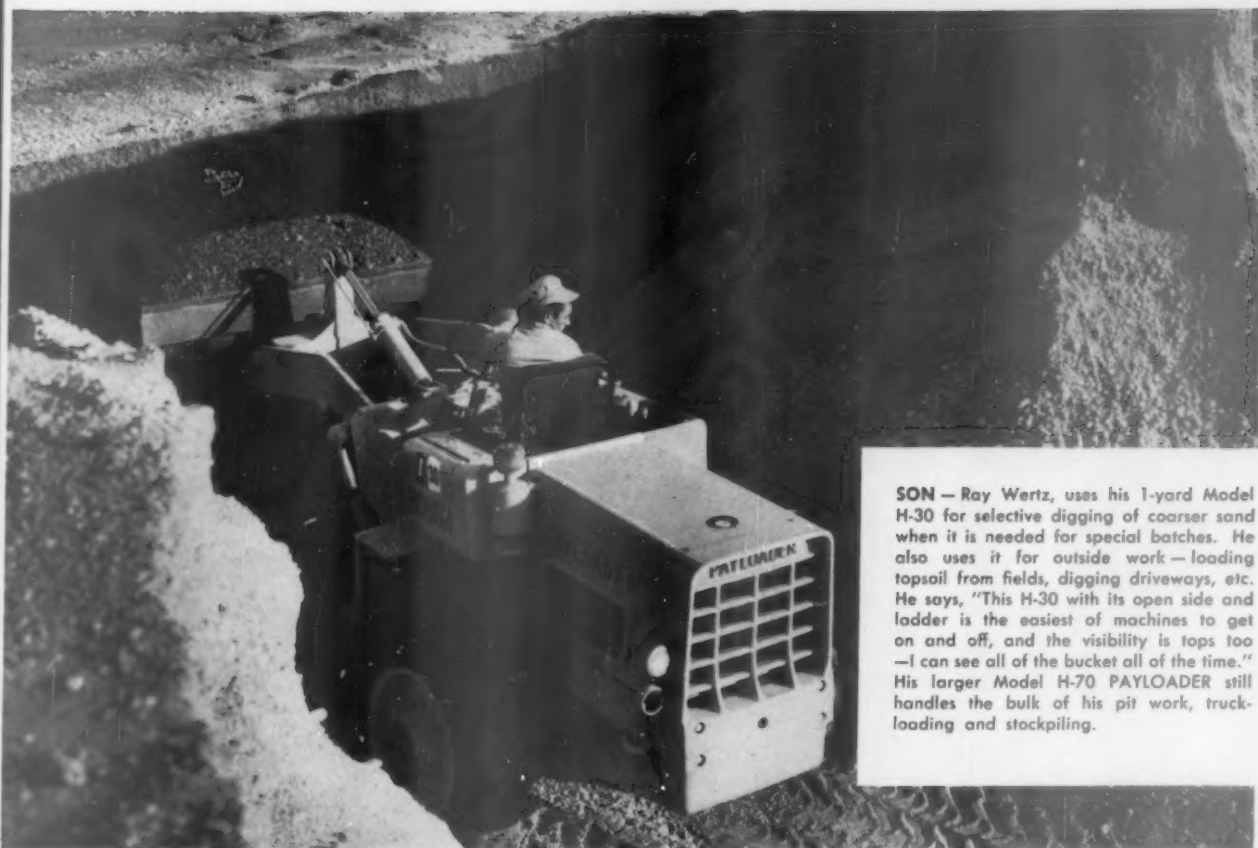
Father and Son again



Although William Wertz and his son, Ray, are friendly competitors in the sand-gravel business, they agree that, "it pays to use a PAYLOADER."

Just one year ago, a Hough advertisement reported on the use of PAYLOADER tractor-shovels by this same father and son in their separate sand-gravel businesses in Kenosha County, Wisconsin. In the meantime each one has purchased a new-design Model H-30 unit with 1-yard bucket. The father replaced a larger PAYLOADER, while the son's H-30 supplements his larger H-70. This H-70, with 2-yard bucket, still handles the bulk of his tonnage—feeds the crusher (100 tons per hour), loads trucks in the pit, loads customers' trucks and moves material from crusher to stockpile.

PAYLOADER®



SON — Ray Wertz, uses his 1-yard Model H-30 for selective digging of coarser sand when it is needed for special batches. He also uses it for outside work — loading topsoil from fields, digging driveways, etc. He says, "This H-30 with its open side and ladder is the easiest of machines to get on and off, and the visibility is tops too — I can see all of the bucket all of the time." His larger Model H-70 PAYLOADER still handles the bulk of his pit work, truck-loading and stockpiling.

select **PAYLOADER®**

Ray Wertz, the son, says, "The PAYLOADER line is so well engineered that it will be a long time before anyone builds tractor-shovels to match them." Pit and plant operators, like the Wertz family have been profiting with PAYLOADER work-ability and dependability for 20 years. Today's PAYLOADER line consists of 20 models in 8 sizes with operating capacities from 2,000 to 12,000 lbs. — a type and size for every size job.

Your nearby Hough Distributor is ready to serve you with complete parts and service facilities backed by Hough field service personnel.



This 2-yard Model H-70 PAYLOADER continues to be Ray Wertz' main production loader for pit loading, crusher feeding, stockpiling and final loading.

HOUGH®



THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS

SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

THE FRANK G. HOUGH CO.

705 Sunnyside Ave., Libertyville, Ill.

Send data on the complete PAYLOADER line

Name _____

Title _____


Company _____

Street _____

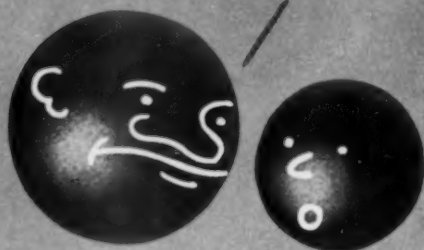
City _____

State _____

1-B-3



"It ain't easy to
get Coates' approval
...you gotta be
tough to the core"



Coates Triple-Forged Carbex Grinding Balls really have to be able to take it ... and dish it out. Continued checks and calibrations throughout the manufacturing process protect the high standards and assure uniformity ... made of fine-grained, high-carbon steel ... Scientifically heat treated to the core, they are hard, to last longer and to grind better; tough to avoid shattering under stress of milling. Production run tests show that job for job and dollar for dollar, Coates out-performs grinding balls costing many times more. Yet, Coates sponsors continuing research to find ways of making even better grinding balls.

Call for Coates Triple-Forged Grinding Balls ... built with care for better wear.

Write for prices ... all sizes — 1/2" to 5" carried in stock for immediate shipment.

CS61-1

COATES

STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

**LARGEST EXCLUSIVE MANUFACTURER
OF GRINDING MEDIA**

INDUSTRY NEWS

(Continued from page 68)

Announce new edition of "Accident Facts"

NATIONAL SAFETY COUNCIL is distributing the 1960 edition of its statistical yearbook, "Accident Facts." The 96-page book contains accident rates by major industry groups. It has ideas for making speeches, writing articles and planning safety campaigns. Several sections are devoted to work accidents and provide a comprehensive background for an industrial safety program.

For information about obtaining copies of "Accident Facts," write to National Safety Council, 425 N. Michigan Avenue, Chicago 11, Ill.

Dundee Cement builds two distribution centers

CLEVELAND AND CINCINNATI, OHIO, will have cement distribution and service centers for Dundee cement, announced Roblee B. Martin, vice president and general manager of Dundee Cement Co., Dundee, Mich. Each facility will cost about \$400,000 and will have two steel silos with total unloading capacity of 150 tph. They will receive shipments from the plant via rail or truck.

What's coming in February

A dearth of first-rate aggregates in Florida and southern Georgia has retarded heavy construction in these areas. Stockbridge Stone Div. of Vulcan Materials has built a new granite processing plant in Georgia to meet the demand for this aggregate.

Norman Kelsey named Builder of the Year

A GOLD-PLATED HAMMER was awarded to Norman Kelsey of Kelsey Construction Ltd., Burnaby, Canada, at the annual banquet and dance of the Vancouver Metropolitan House Builders' Association. J. L. Glassford of B. C. Cement Co., Ltd., made the presentation. This was the second "Builder of the Year" award to be given for outstanding service to the VMHBA. Mr. Kelsey is president of the Builder's Association.

(Continued on page 74)

Hook an OWEN Clamshell Bucket to your crane and you're sure of superior performance and longer life. For OWEN Buckets have exclusive super-efficiency and long-lived features you won't find in ordinary clamshells.

For instance:

- Block and tackle type reeving
- One-piece head construction
- Recessed lips
- Single main shaft
- Riveted bowl assembly

For over half a century OWEN has been building clamshell buckets—tailored to meet the requirements of "men who move the earth the world over".

So team your crane to the bucket with the BIG BITE that's JUST RIGHT for every job!

Write today
for the money-saving
facts and figures.

THE
**BIG
BITE**

**THAT'S
JUST
RIGHT!**

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BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida
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INDUSTRY NEWS

(Continued from page 73)

Lee's Summit council authorizes operation

A YEAR-LONG HASSLE over operation of a rock quarry in Lee's Summit, Kan., ended in mutual agreement in October. The city council amended its zoning laws to permit Union Construction Co. to operate the quarry, concrete products and asphalt plants. In return, the company agreed to withdraw its appeal of two court cases.

After failing to obtain an operator's license from the city for the quarry through mandamus action, it had filed a motion for appeal with the Kansas City Court.

The attorney for Union Construction Co. said that his client would agree to pay an \$8,050 fine imposed by the police judge on 22 counts of violating Lee's Summit laws by operating the quarry, despite the fact that he considered the company's position proper.

Mayor C. Q. Oldham of Lee's Summit, who presided, said that he would favor the amendment to the zoning laws only if certain restrictions were

included. These govern noise, dust, odors and size and frequency of dynamite blasts. The restriction does not permit the manufacture of concrete products in the company's 141-acre site on highway 50. The ready-mix plant and an asphalt plant will be moved to the quarry site.

Pamphlet details lime deposits

GOOD QUALITY DEPOSITS of limestone and dolomite that appear to be suitable for use in the portland cement, lime, refractory and other industries in northern California are described in a report by California's Division of Mines. Called "Geology of limestone and dolomite deposits of the southern half of Standard quadrangle, Tuolumne County, California," the report may be ordered from the Division of Mines, Ferry Building, San Francisco, for 75¢ each.

Marquette boosts prices for 1961

RIISING COSTS, particularly of labor, were cited by Marquette Cement Mfg. Co., Chicago, for price raises of 1½ percent to 3 percent at a majority of its plants. Effective on Jan. 1, Marquette will add 10¢ a bbl. to its prices in Milwaukee, Wis., and Superior, Ohio. The new price in Milwaukee will be about \$2.80 a bbl. for bulk shipment.

Prices will go up 5¢ a bbl. at shipping points in Oglesby, Ill.; Cape Girardeau, Mo.; Rockmart, Ga., and Nashville and Cowan, Tenn. Prices will remain unchanged at two Mississippi plants where the company previously gave customers guarantees for 1961. No decisions have been reached concerning prices in Des Moines, Memphis, St. Louis and Chicago.

Portland cement wins farm engineers' award

TWO BLUE RIBBONS for educational material went to the Portland Cement Assn., Chicago, at the 53rd annual meeting of the American Society of Agricultural Engineers. The awards are regular events climaxing an exhibit sponsored each year by the society.

Winning entries, judged on the basis of "outstanding originality and effectiveness," were the association's 16mm color-and-sound film, The Pageant of American Farms, and a magazine issued periodically, The Rural Concrete Builder.

(Continued on page 78)

Job tested

for Economy-Efficiency!

**Get the Long-Lasting
Forged, Heat treated**

**CAPE ANNALLOY
DROP BALL**

FORGED and HEAT TREATED from abrasive resisting **ALLOY STEEL**. Specifically designed for rugged service. Economical, dependable secondary breakage! **SONIC TESTED** before shipment.

Furnished in sizes from
2000 to 12000 lbs.

**CAPE ANN
ANCHOR & FORGE CO.**

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GLOUCESTER, MASS.



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**BUELL-
NORBLO
KEEPS
A
SHOWPLACE
CLEAN**

When Ideal Cement Company invested \$20,000,000 in plant expansion at Ada, Oklahoma, no effort was spared to create a showpiece of structural beauty and modern operating technology housed in gleaming white cement. Cleaning the air in and around this vast production complex is the job accomplished by Buell-Norblo equipment. You'll find Norblo Dust Arrestors at work in the finish mill and packhouse, a Buell Collector and Electrostatic Precipitator cleaning the kiln gases and Buell Cyclones handling clinker cooler vent air. Here, as in other plants where the accent is on the modern and the efficient, you'll find Buell-Norblo doing the job best. The Buell Engineering Company, Inc., Dept. 17-A, 123 William Street, New York 38, New York, Northern Blower Division, 6408 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England). Dust Collection Systems • Cyclones • Electric Precipitators • Bag Collectors • Combination Systems • Classifiers • Discharge Valves



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THE USEFULNESS OF A



HOW TO KEEP A JOB ON SCHEDULE

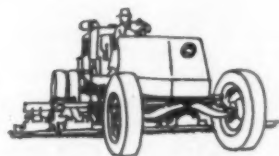
You need machines that work... and *keep* working! Nothing's more useless than a shovel or crane that's "down" when you need it most. Limas have a reputation for staying on the job. They're predictable because they *do* the work you schedule for them. You can count on them. Limas are better built, better engineered for dependable high production, trouble-free operation; favored by users everywhere to outdig, outlift and outlast other makes. Lima quality features include:

- Precision air control—insuring maximum production under the most adverse conditions; permitting feel of the load, instant response.
- Antifriction bearings at all important bearing points, including drums, brake and clutch housings.
- All gears, smaller parts and shafts are flame or induction hardened for longer life.
- Versatility—insuring *plus* value. Limas are not adaptations of single-purpose machines. Each is designed and built for top efficiency, long life with any front end.
- Design flexibility assuring complete transportability; easily dismantled to legal weights.

Call your Lima distributor and arrange to see a Lima at work. Or write us for details.



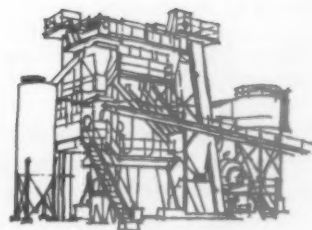
There's a Lima type and size for you—shovels to 8 yd.; crawler cranes to 140 tons, truck cranes to 80 tons, wagon cranes to 75 tons; draglines variable. Interchangeable front ends. Gasoline, diesel or electric power.



LIMA MODEL D ROADPACKER
—Six vibrating shoes consolidate fast, deep for profitable single-course construction; available in 12-shoe Super model.



LIMA AUSTIN-WESTERN portable and stationary crushing, screening and washing equipment; including jaw crushers, roll crushers, feeders, screens, elevators, conveyors, bins.



LIMA MADSEN ASPHALT PLANTS
—available in models with batching capacities from 1000 to 10,000 lb.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division • Lima, Ohio
BALDWIN • LIMA • HAMILTON



CALENDAR

OF COMING EVENTS

1961

January 17-19, 1961—National Limestone Institute Inc., 16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.

January 17-20, 1961—National Crushed Stone Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

January 23-26, 1961—National Sand & Gravel Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

Jan. 29-Feb. 3, 1961—American Society for Testing Materials, Committee Week, Netherland Hilton Hotel, Cincinnati, Ohio

February 10, 1961—12th Annual Symposium on Geology as Applied to Highway Engineering, University of Tennessee, University Center, Knoxville, Tenn.

February 20-23, 1961—American Concrete Institute, 57th Annual Convention, Chase-Park Plaza Hotels, St. Louis

February 23-24, 1961—Expanded Clay & Shale Association, Annual Meeting, Sheraton-Jefferson Hotel, St. Louis, Mo.

Feb. 28-Mar. 2, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, Annual Meeting, Chase Hotel, St. Louis, Mo.

March 5-8, 1961—American Road Builders Association, 59th Annual Convention, Atlantic City, N.J.

April 12-14, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, International Symposium on Agglomeration, Sheraton Hotel, Philadelphia, Pa.

April 18-20, 1961—American Institute of Electrical Engineers, Cement Industry Technical Conference, The Sheraton-Cadillac, Detroit, Mich.

April 24-25, 1961—American Institute of Mining & Metallurgical Engineers, Southwest Minerals Conference and National Meeting of the Industrial Minerals Section of the Society of Mining Engineers of AIME, Stardust Hotel, Las Vegas, Nevada

April 27-29, 1961—Texas Aggregates Association and Texas Ready Mixed Concrete Association, 7th Joint Annual Convention & Equipment Show, Robert Driscoll Hotel, Corpus Christi, Texas

INDUSTRY NEWS

(Continued from page 74)

Kiln additions will boost cement production

IN RECENT WEEKS two companies announced plans to add a rotary kiln to existing plant facilities. They are Huron Portland Cement Co., Alpena, Mich., and Phoenix Cement Co., Clarkdale, Ariz.

Huron, a subsidiary of National Gypsum Co., will increase capacity by 2 million bbl. with a new 15 x 460-ft. kiln. The kiln and accessory equipment are expected to be in operation by January 1962.

Phoenix, a division of American Cement Corp., will add 800,000 bbl. to annual capacity with its new kiln. Installation of the kiln will complete the plant as originally engineered, bringing capacity to 2.6 million bbl.

What's coming in February

The great Southwest is one of the nation's boomingest construction markets. Kaiser Gypsum Co. has recognized the possibilities of the area and built its newest gypsum board plant at Rosario, N.M.

Marquette snares another Oscar

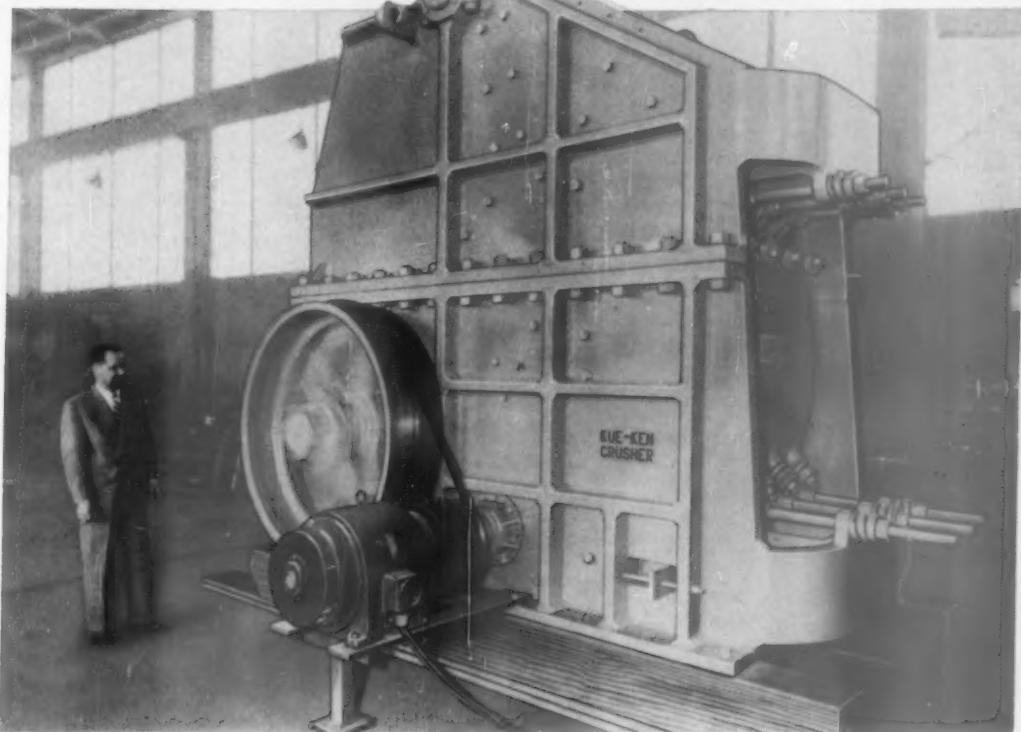
YEAR'S END found Marquette Cement Mfg. Co., Chicago, in possession of 21 awards for excellence in annual reporting. For the 16th consecutive year, the board of judges of Financial World named the company's report the best in the cement industry. A bronze "Oscar of Industry" trophy was presented to President W. A. Wecker at an Awards Banquet in New York as a symbol of achievement.

Marquette's tally of such awards includes two gold Oscars for tops in annual reports, three silver trophies for the best of all manufacturing company reports and 16 industry recognitions. This record, it is said, is without peer in the United States.

Approximately 5,000 reports were entered in the 1960 competition in various industrial categories. Runner-up for top honors in the cement classification was Permanente Cement Co. (Kaiser affiliate) followed by Lehigh Cement Co. in third place.

END

KUE-KEN® patented flywheel release automatically "cuts out" costly downtime and repairs



Resetting overload requires only a wrench

Tramp iron that often breaks the frame or toggles of conventional crushers is no problem with Kue-Ken. Its flywheel automatically cuts out on tramp iron and runs free without ratcheting. Gone are lengthy downtime, costly repairs and expensive replacement parts, lost production time and idle labor! On release of the flywheel, an alarm will sound or the motor will stop automatically. On simple removal of the tramp iron, the Kue-Ken flywheel can be quickly reset and the crusher put back into immediate operation.

Kue-Ken uses far less power than conventional crushers. Its precision machined toggle mechanism operating in a sealed, filtered oil bath reduces wear and friction to the absolute minimum. The Kue-Ken pendulum type swing jaw with no heavy reciprocating parts to lift operates with a far smaller flywheel requiring only a normal duty squirrel cage motor. In shop test, the 48" x 42" Kue-Ken crusher above is started by a 30 hp motor with a single vee belt and runs mounted on skids not fastened to the floor at the operating speed of 275 rpm on only 17 hp! The Kue-Ken pendulum jaw swings in an almost straight line and crushes rock squarely without rubbing. Full power is used to crush rock, not to wear out jaw plates. The Kue-Ken pendulum type action also provides maximum leverage where it counts most—at the top of the swing jaw for crushing large rocks. Operating smoothly, efficiently, Kue-Ken crushes at higher speeds for higher capacity and a more uniform product.

KUE-KEN® CRUSHERS STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

"CRUSHING without rubbing"

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
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SEATTLE, WASH., Washington Machinery Co. • VANCOUVER, B. C., Universal Equipment Co. • SALT LAKE CITY, UTAH, Lund Machinery Co. • SAN ANTONIO, TEX., Clossner Equipment Co. • LOS ANGELES, CALIF., Garlinghouse, Freeman Co. • SAN FRANCISCO, CALIF., Aggregate Engineers, Inc. • PORTLAND, OREGON, Air-Mac, Inc. of Oregon • BISMARCK, NORTH DAKOTA, Midwest Equipment Co.

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HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN



Vibrating feeder assembly

A BIG VIBRATING FEEDER sometimes poses problems of proper mounting under bins or truck dump hoppers. This is particularly true if there is no structure to support the front end of the unit.

A western sand and gravel producer with this problem solved it neatly by suspending the front of his big vibrating feeder from a single bracket. Here's how he did it.

A heavy plate and channel bracket was secured to the forward wall of his concrete dump hopper. Just one bracket eliminated any problems of alignment. Wire rope suspended an I-beam just a little longer than the width of the feeder and, in turn the feeder was suspended with wire ropes secured to the ends of the beam.

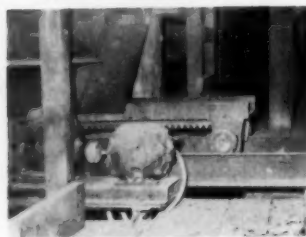
Asbestos roads

NOT MANY rock products producers will be able to benefit greatly from the ingenuity of a Canadian asbestos producer who built up his haul roads with asbestos wastes. But it may still be something to keep in mind.

Test sections in the mine haul roads were paved with mixtures of asbestos tailings, asbestos fines and asphalt.

Over the years, these sections have stood up superbly under the pounding of many heavy trucks. While the actual mixing and laying techniques are not known, about 2 percent by weight of asbestos is mixed with asphalt. So successful have these experiments been that highway researchers are trying the same thing in the United States.

Bin gate control



REMOTE CONTROL of a slide gate in the bottom of a bin is possible with this drive arrangement. A cast tooth rack is bolted to the plate, a channel section in this plant, while the spur gear is mounted on the output shaft of a worm reducer.

The reducer is driven with a small electric motor, and the movement of the slide gate is controlled by a limit switch at each end. In this way, all the operator has to do is to push a button that starts the motor. (NCSA photo)

Crushing efficiency

A WESTERN iron ore processor has developed several ideas for improving the efficiency of his crushing circuits that might benefit aggregates producers. His four third-stage cone crushers are mounted on concrete foundations above grade and over the vibrating screens.

This arrangement takes out finished product immediately and sends it to storage; only oversize to be recrushed

is put into the recycle circuit. Apparently, the cost of these foundations was not greater than the more conventional arrangement of pits for crushers and screens in towers above the crushers.

Recycle rock joins incoming oversize in small surge bins and each bin is fitted with a vibrating feeder. This ingenious design makes sure that each crusher is supplied with material and is working close to capacity at all times, irrespective of the amount of recycle rock.

Clean return belts

A WESTERN sand and gravel producer was plagued with an accumulation of silt in his reclaim tunnel and at the foot end of several belt conveyors handling sand. His first attempt to solve the problem was to tap a water line to put a spray bar under the head pulley of the conveyor.


This was a big improvement and might have solved the problem for most conveyors. However, the finishing touch was provided by the installation of a rubber-bladed scraper. This not only wipes off excess sand into a collecting chute but avoids an accumulation of water at the tail shaft.

Frogman for dust collectors

MAINTENANCE MEN in asbestos plants in Canada now put on underwater apparatus when they go into the huge dust collectors. Since most bag collectors are inspected, cleaned and adjusted with the big fans operating, some form of protection is essential.

Equipment for the properly protected man consists of face mask, respirator, compressed air cylinder with half-hour's supply of air and pressure-reducing valves. In addition to routine maintenance and inspection, this equipment is used when the collectors are shut down for their annual cleaning.

(Continued on page 82)



4-in-1 clam-handles more quarry jobs than any single-action rig!

And the 4-in-1 is a multi-purpose clamshell that can strip and grade with accuracy—"clam-handle" and load heavy, unwieldy materials, like stumps, that other loaders can't touch! Prove to yourself the 4-in-1 can give you *whole job* "equipment spread" utility—and give you more in earning capacity than any single-action rig built! Let your International Drott Distributor demonstrate.

It's a back-dragging clamshell!

With his TD-6 Four-in-One's clam in back-dragging position Herbert Wing, owner of West End Construction Company, Oneonta, N. Y., pulls down bank gravel by the truck load—for fast, easy loading. "The 4-in-1 is the only loader for me," states owner Wing. "It is versatile, to do the jobs of several machines, yet with a single-machine investment. It's fast, and the direct-start, 6-cylinder engine gives plenty of power."



It's a fast-producing bulldozer!

With the clam open and blade segment in 'dozing position, this TD-15 Four-in-One does quarry clean-up after blasting—doubles for a full-size, full-capacity bulldozer. Then with clam-action, the "15" picks up and drops large rock slabs on the quarry floor—to break them so the power shovel and jaw crusher can handle them. Owner: Cedar Bluff Stone Co., Princeton, Kentucky.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL®
DROTT®

It's a shovel-beating loader!

Dulin Bauxite Co., Murfreesboro, Arkansas, uses this International Drott TD-15 Four-in-One as a 'dozer for clean-up of gypsum after blasting. Then the 4-in-1 loads out trucks faster even than their fast-swinging power shovel. "We use the 4-in-1 as a loader, and just like your advertising says, as a clamshell, a shovel, and a dozer," states Mine Superintendent Ralph Lewis. Note exclusive and positive 4-in-1 bottom-dumping.





Gingerbread improves efficiency

COST-CONSCIOUS rock products producers often murmur about the extra expense involved to install many of the belt conveyor devices that can improve the safety or efficiency of their conveyor systems. But a southern gypsum producer feels that the devices in his system pay off handsomely, both as insurance against breakdown as well as in product improvement.

The belt conveyor above his primary crusher is equipped with an electromagnet to take out iron contaminants. Under the magnet is the head pulley fitted with vulcanized rubber lagging that improves belt traction under heavy loads.

And on the return portion of the belt, right beneath the head pulley, is a counterweighted belt scraper. This peels off any fine gypsum that might stick to the belt and eventually build up on the return idlers. Finally, the inclined belt's headshaft is equipped with a brake that stops the loaded belt from running back downhill if the conveyor motor stops. This is a very necessary precaution that would prevent heavy blocky gypsum rock from discharging over the tail end of the conveyor into a narrow tunnel.

Repaint your gratings for more light

WHEN I was being shown through a tall screening tower, the foreman asked if he shouldn't put in a requisition for grating with wider spacing so that more light would get into the middle of the building.

However, I pointed out that the walkway and stairs has been painted dead-black. If the gratings were painted white or aluminum, more light

would be dispersed in the building. This was done and the light level was increased, sparing the expense of installing wider gratings or adding more light fixtures.

W. F. Schaphorst, Newark, N. J.

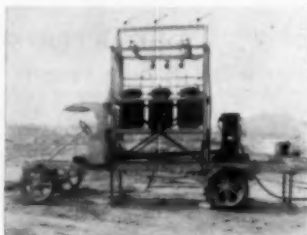
Compressed air screen cleaning

AN ONTARIO sand and gravel producer uses compressed air to keep vibrating screens from blinding with damp materials. With moisture ranging between 7 to 20 percent and with his materials always having a trace of clay, screen blinding was a continuous problem.

A 2-in. id. perforated pipe was installed the full length of the lower, or sand deck, of a vibrating screen. It is mounted on an airheader that moves back and forth across the width of the screen. The blast of air from the pipe is directed against the underside of the screen cloth. Apparently, it practically eliminates blinding.

Compressed air is supplied by a small compressor at 50 psig. The one screen uses about 250 cfm. of compressed air. No after-cooler is used since heated air seems to improve screening efficiency.

Portable power center



HOW MANY crushed stone producers would see the use for an antique truck chassis? Not many, we'd guess. But a southern producer did and gave himself rich dividends for his vision.

The rig provides stability to support the incoming power lines and enough strength to support the transformers to step down the power for quarry machinery. And as the face moves or the machinery is needed elsewhere, the power lines are disconnected and the whole rig moved to the next location.

Rail car loading efficiency

IT TAKES A BOOM CONVEYOR and a three-way chute to load gondolas at rates better than 750 tph. at a southwestern crushed stone plant. The whole assembly is operated by electric motors controlled from the operator's room right under the conveyor.

Boom-raising is necessary to clear a locomotive. But it is lowered to load cars. With the three-way chute, aggregates are put into all parts of the car to reduce trimming time. Fine adjustment and direction of the flow of rock is achieved with a flop gate in the throat of the big chute.

While each car is slowly moved into place, the operator diverts the flow of aggregates to another storage system. A motor-operated flop gate in a chute at the tail end of the boom conveyor responds to the operator's signal.

Plioilm wrapped machinery

AN INGENIOUS Canadian producer and a shower curtain maker got together to develop a heavy-duty replacement for tarpaulins to cover heavy machinery. This plastic has conclusively proved itself under rugged conditions when tractors, bulldozers, trucks and production machinery must be protected from winter's ice blasts.

Rolls of 12-ga. polyvinyl chloride plastic are readily available in 60-in. widths. These are cut, fitted and sewn with nylon thread to fit the profile of the machine to be covered. Grommets sewn into the edges permit the sheets to be secured to the ground with ropes.

Other users in Canada have discovered that the plastic films are light, strong and easy to handle. Cost runs about 20¢ a sq. ft., about a quarter of the cost of a duck tarpaulin, and the finished wrap is transparent.

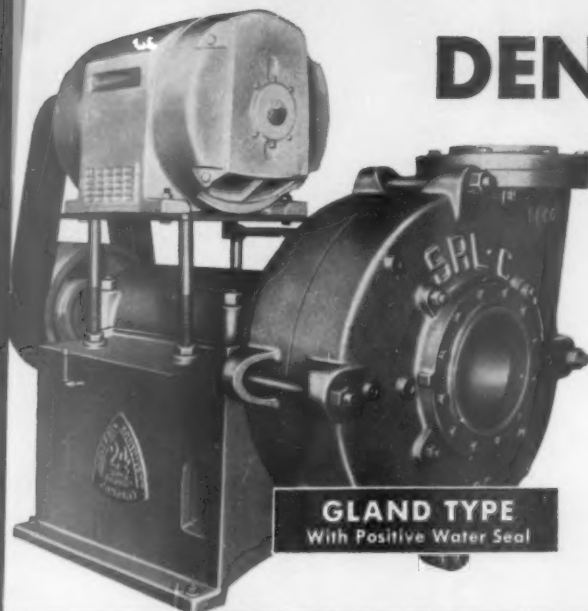
Bit grinding shop

THIS BIT-GRINDING SHOP is placed within a few yards of the drill rig that uses the bits. It is a simple little steel box mounted on steel runners and holds bit grinder, grinding wheels, extra bits as well as a few supplies. When the drill rig moves from one part of the big quarry to the next, the portable shop is closed up, moved into place and reopened for business.

END

DENVER SRL PUMPS

Now available in TWO Models



GLAND TYPE
With Positive Water Seal

FOR AN EVEN
WIDER RANGE OF
PUMPING APPLICATIONS



GLANDLESS TYPE
No Gland—No Sealing Water

AVAILABLE IN THESE SIZES AND CAPACITIES

Specifications and Dimensions

Pump Size and Type	Capacity 60' Head RPM	HP	Water GPM	Dimensions (in.) L	W	H	Approx. Shipping Wt. Lbs.
GLAND TYPE							
1 1/4" x 1"	2000	1.1	30	20	12 1/2	13	135
1 1/2" x 1 1/4"	1790	2.2	70	25	17	19	300
2 1/2" x 2"	1600	5.2	170	25 1/2	17 1/2	19 1/2	325
3" x 3"	1520	8.6	300	31 1/4	19 3/4	21	500
5" x 5"	1190	25.3	1000	37 3/4	26 1/4	30	980
6" x 6"	1125	30.3	1400	45 1/4	28 1/2	33	1320
3" x 3" -C	1550	8.4	300	37 1/2	21 1/2	23	780
5" x 4" -C	1145	16.3	700	40 1/4	27	29	1200
8" x 6" -C	882	29.5	1400	57	36 1/2	38	3000
10" x 8" -C	770	61.0	2900	64 3/4	43	44	4000
12" x 10" -C	615	96.0	4600	69 3/4	46 1/2	49	5300
"TRU-GLANDLESS" Type (TG)							
1 1/4" x 1" TG	2000	1.1	30	20	12 1/2	13	135
3" x 3" -C TG	1550	9.4	300	37 1/2	21 1/2	23	780
5" x 4" -C TG	1145	18.3	700	40 1/4	27	29	1200
8" x 6" -C TG	882	33.0	1400	57	36 1/2	38	3000
10" x 8" -C TG	770	70.6	2900	64 3/4	43	44	4000

*Based on water. Multiply horsepower by specific gravity of pulp to obtain actual brake horsepower.

DENVER "TRU-GLANDLESS" SRL PUMP... A MAJOR ADVANCE IN PUMP DESIGN

DENVER SRL Pumps with positive water seal already have a world-wide reputation for their high efficiency, low part cost, long life. If dilution of pulp or slurry is a problem, you now get the extra advantage of "TRU-GLANDLESS" construction. Requires no sealing water, no packing glands, eliminates pulp dilution.

No Sealing
Water

No Packing
Gland

No Pulp
Dilution

SEND DETAILS OF YOUR PUMPING PROBLEMS TO DENVER

Complete Mineral Processing Equipment

"The firm that makes its friends happier, healthier and wealthier"



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LEFT: Dam and government construction in all parts of the country promises a boost for rock products producers

ROCK PRODUCTS FORECAST

A special report by the Editors of ROCK PRODUCTS

Hope for 1961: Growing markets, no inflation

THE DAY AFTER THE 1960 PRESIDENTIAL ELECTION, a Savings & Loan institution in southern California came out with a postcard to prospective borrowers. It said, "Come and see us for some of the new, easy Kennedy money." Unwittingly, perhaps, the promotion-minded banker who designed this mailer put his finger on the key to the business prospects in the rock industries for 1961: Easy money and easy spending—in the construction sectors where rock products producers are likely to benefit the most.

This is the broad picture. But it is also the easy one. Specific prospects are not that cut-and-dried. There are some substantial deterrents as far as the rock products industries are concerned. They include:

- A Senate in which Southern conservatives and northern Republicans may hold a balance of power and pare down public spending;
- A receding housing market which even easy mortgage money will be difficult to set afire once again;
- Growing imports that will continue to make inroads on domestic producers;
- New restrictions on depletion allowances.

Balanced against this is a pledge by the Kennedy Administration to increase spending in the public sector. Presumably this will include beefing up the malingering federal highway program.

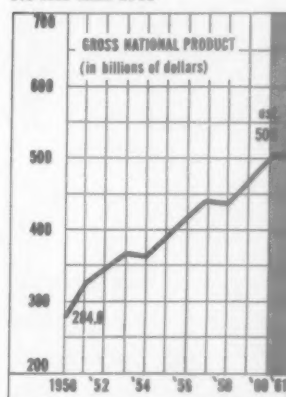
How, then, do these diverse elements balance out in assessing prospects for producers in 1961?

The general tone is optimistic. It has to be. A sizeable proportion of rock industry business is done in the public sector, and here the prospects for increased activity during the next four years are very high. Increased demand for educational, hospital, military, highway and conservation facilities will likely send total construction soaring to a new national record next year—with prospects of further increase in succeeding years. How much inflation will accompany this resurgence and destroy its beneficial effects for rock products producers is the great imponderable at this moment. We can only wait and see.

In this general expectation of increasing construction markets, it is important, however, for the producer to be aware of some soft spots. For example:

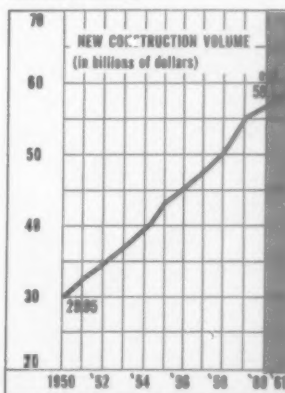
- The highway program desperately needs more money—much more money—to build up a new construction impetus. This will become a primary order of business for Congress when new reports on the

GROSS NATIONAL PRODUCT:
No less than 1960



Source: Statistical Abstract of the United States, ROCK PRODUCTS estimates

NEW CONSTRUCTION VOLUME:
Should increase



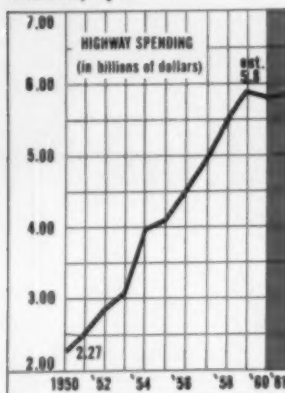
Source: Construction Volume & Costs; Construction Review, and ROCK PRODUCTS estimates

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HOPE FOR 1961: GROWING MARKETS, NO INFLATION

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HIGHWAY SPENDING:
Definitely up



Source: Construction Volume & Costs; Construction Review, and ROCK PRODUCTS estimates

The producer who vigorously seeks out markets should find them...

highway program are submitted by the Bureau of Public Roads for Congressional consideration in January.

Presumably the needed funds will be provided, but there might be some foot-dragging. This is likely to be one of the first of the free-spending programs to come before Congress, and there may be an effort by Southern Democrats to pare down the highway increases. The decision on the refinancing of the highway program, due early in 1961, will provide the key to the prosperity of the rock products industries next year. And the chances are certainly better than average that the program will be provided with a new, sound and essential financial impetus.

● Housing is something else again. A number of diverse forces are putting pressure on the housing market, and it is still uncertain which way it will bend. Positive factors are easier mortgage money and probably increased federal aid for housing. On the negative side is the slackening demand for housing and the temporary decrease in newly married young people seeking homes.

In weighing these factors, many housing experts are emphasizing the need to recognize that the housing market of the 1960's will be quite different from that of the '50's.

Dr. Leon T. Kendall, economist for the United States Savings & Loan League, pointed out recently: "We find ourselves today at a point where further liberalization in terms in both conventional loans and government-backed mortgages produces very little effect on monthly payments. We can expect little stimulation of housing through financial arrangements, barring a complete change in the method by which homes are purchased.

"Those interested in keeping home building at a pace comparable to the record of the postwar years may now have to find ways other than financing techniques to energize their market. Perhaps greater attention will be given to construction costs and home design. Housing volume of the '60's will be tied more to family income, household formations and the ability of the housing industry to entice existing homeowners to trade up in the quality of homes."

Most of the leaders in basic industries in the United States, after an uncomfortable 1960 in which superficial prosperity frequently wavered on an uneasy foundation, have put their finger to the economic wind and decided to take the offensive. A vigorous move in this direction was badly needed and, apparently, such a move will take place in 1961. This bodes well for American business, for the nation as a whole and for the rock products industries.

This attitude was well summarized recently by Fred G. Donner, chairman of the board of General Motors, when he said: "The economy should be in a strong position to expand in 1961." To back up this assertion, GM is investing \$1.75 billion in its worldwide operations in 1961. Other industries are following this lead—which will mean a resurgence in commercial and industrial construction. At the same time, growing expenditures for armaments and space exploration will require construction of facilities capable of handling monstrous new aircraft and missiles now in the planning or early production stage.

Last year saw the first decline in spending for construction since

the end of World War II. All the signs indicate that most of the factors responsible for that decline (a slight one, about one-half of one percent)—tight money, cutback in the interstate highway program, slowdown in housing, emphasis on budget in the federal government, defeat or veto of numerous federal aid projects that would have stimulated construction—will either be modified or will disappear in 1961. Thus, construction spending should once again begin to climb. In addition, such continuing growth factors as a steadily increasing population and buying power will add impetus to the upward movement.

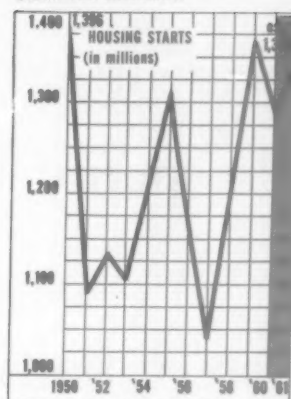
The most disturbing note in this general chorus of construction optimism is the bugaboo of inflation, which could turn dreams of a stable market for many of the rock products industries to a nightmare of swelling costs and taxes. But right now, we're a long way from inflation, and present economic barometers show a tendency in the other direction. This, of course, can change under the new Administration—but, perhaps, not nearly as drastically as some businessmen now fear. Dr. Woodlief Thomas, adviser to the Federal Reserve Board of Governors, said recently that there is presently in the United States an "abatement of inflationary expectations." He added: "There has ceased to be any reason for restraints on credit expansion"—which is a reserved way of saying, "let 'er rip, men."

To what extent the Kennedy Administration will change this economic climate—if at all—remains to be seen. But inflation should not be a problem for the rock products producer in 1961. The producer who vigorously seeks out markets should find them; and the producer who vigorously promotes his product should be able to enjoy the fruits of that promotion—at least in 1961.

Summing up: The Kennedy Administration is taking over a slightly deflated economy in which increased public spending should provide stronger and broader markets for rock products producers without an immediate threat of inflation—at least in 1961. Construction, after a 1959 setback, should increase by 5 percent or more in 1961—paced by a strong resurgence in the interstate highway program and tempered by a continued slowdown in housing and depletion allowances and an increase in imports. Prospects are above average to good, with much depending on the vigor, efficiency and aggressiveness of individual industry producers.

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HOUSING:
Continued slowdown



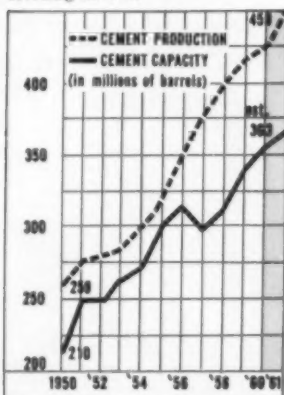
Source: U. S. Dept. of Labor

The producer who vigorously promotes his product should enjoy the fruitful returns of that promotion



Portland cement: Prosperity with reservations

CEMENT PRODUCTION:
Holding its own



Source: Bureau of Mines, and
Rock Products estimates

THE PORTLAND CEMENT INDUSTRY, although beset with many marketing and technical problems, has two important pluses on its side in 1961. First, some remarkable new advances in automation will assuredly increase the efficiency of cement production for those companies able to purchase and install the new equipment, which probably requires one of the largest capital outlays of any industry. Second, advances in the design and technique of structural concrete give promise of expanding markets at the expense of competitive products, regardless of what happens to the over-all market. These factors, plus an expected increase in construction in the United States in 1961, give promise of a satisfactory year ahead for the portland cement industry.

Complicating this generally happy picture are some acute problems. Among them, cement industry respondents to the ROCK PRODUCTS survey emphasized:

- Reduction in depletion allowance, recently enacted by Congress, which has hit some cement companies rather hard;

- Overcapacity. "There is a tendency," said one cement manufacturer, "for a few producers to ship beyond natural marketing areas in an attempt to maintain past sales rates. Many companies have failed to adjust to an 80 percent running capacity as being normal and best for their own interests as well as those of the industry as a whole. Some unsound sales practices have resulted."

- Increasing imports. Several companies are feeling this problem acutely, and a growing number of others are beginning to look uncomfortably over their shoulders.

- Steadily increasing costs, or—as one producer put it: "Inflation, inflation, inflation."

Yet, strangely enough, only about half of the survey respondents said they considered themselves in a cost-price squeeze. One who did, pointed out earnestly: "We must re-establish a reasonable cost-price relationship. During the last five years, prices of cement generally have been established on the presumption that the court decisions on percentage depletion, which still stand, would be final with respect to effective tax rates. The uncertainty with regard to this question has impaired the industry's ability to budget and to plan its capital programs. The price level is, therefore, uncertain as are costs since taxes constitute one of the major costs of doing business."

Some remarkable increases in output per man-hour have resulted



from continuing automation of cement plants. Such expensive new equipment as electronic computers, autometers, concentric preheaters and various types of automatic centralized controls are slowly but steadily converting cement manufacture to an automated process. The barrels per man-hour figure reported by survey respondents ranged from a low of 4.4 to a high of 11.35—with the average efficiency rate increasing from 7.05 bbl. in 1959 to 7.39 in 1960. Most producers expect to improve on this figure in 1961—some by as much as 25 percent.

Producers of portland cement also expect to increase their production by 5½ percent in 1961 over 1960. The projected increase will then tail off to about 2 percent in 1962, increasing to 3 percent in 1963, according to the survey returns.

The growth will come both from increased use of existing capacity and expansion of production facilities. Respondent companies expect to increase the use of their present capacity from 79 percent in 1960 to 87 percent in 1961. And almost half of those companies answering the survey expect either to open new plants or extensively modernize old ones during the next three years.

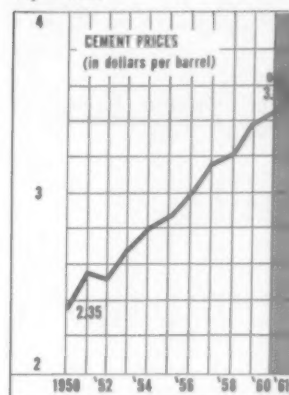
Half of the companies also raised prices in 1960, and half expect to raise them again in 1961—but the increases average out at less than 5 percent.

The selling market which the largest number of cement manufacturers expects to increase is precast structural members—or, as one producer put it: “all prefabricated concrete products.” Opinion is divided on housing and industrial construction, emphasizing once again its essentially regional fluctuation. Highways were mentioned rather cautiously by cement manufacturers, leaving the impression that they expect highway business to increase, but they’ll believe it when they see it.

Summing up: Technical and technological progress, both in the manufacture and uses of portland cement, should combine with increases in construction activity to make 1961 a year of growth and prosperity for the portland cement industry. Because of some rather strong factors pulling the other way—e.g., lowered depletion allowances, increased imports, overcapacity—it may likely be an uneasy sort of prosperity, but the prospects are generally above average to good.

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CEMENT PRICES:
Up a trifle



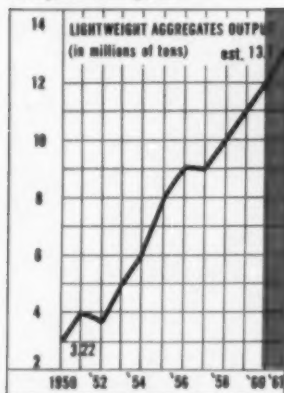
Source: Bureau of Mines, and Rock Products estimates

Growth will come both from increased use of existing capacity and expansion of production facilities



Lightweight aggregates: Still going up

LIGHTWEIGHT AGGREGATES:
Prospects look good



Source: Bureau of Mines, and
Rock Products estimates

LIGHTWEIGHT AGGREGATES continue to be the fastest growing segment of the rock industries. All the signs point toward continued growth in 1961. Increases in the use of structural concrete will add further impetus to an already fast-expanding industry.

Strangely enough, the two industry problems mentioned most frequently by respondents to the ROCK PRODUCTS survey act upon each other irrevocably:

1. Lack of recognition by architects;
2. Maintenance of top quality.

Consistent, predictable top quality is obviously a prerequisite for widespread architectural recognition. Other problems mentioned most frequently tie in with this same pattern of need for acceptance . . . e.g., the lack of reliable engineering data and the need, as one producer expressed it, "to promote confidence in lightweight concrete as to placement and performance."

Survey respondents expect a production increase in lightweight aggregates of 13 percent in 1961 over 1960. This roughly parallels over-all production in the lightweight aggregate industry, which jumped from 11 million tons in 1959 to 12 million in 1960, and is expected to reach close to 14 million tons in 1961.

Part of this prospective increase will come from increased use of existing capacity; responding companies expect to increase use of present capacity from 86 percent in 1960 to 93 percent in 1961. About 40 percent of the reporting producers also expect to install new plants or modernize and expand old ones in the next two years. Only one lightweight aggregate producer in five raised prices in 1960, and about the same ratio is expected to hold in 1961.

Summing up: Prospects continue to look good for the lightweight aggregates industry in 1961. Growing acceptance by builders and architects will accentuate a production trend already pointed steadily upward. Principal problems will continue to come from within—the maintenance of high standards of quality and the growing attraction of the industry to large outsiders casting about for a place to expand.



SAND AND GRAVEL PRODUCERS are generally setting their sights upward in 1961—after a leveling off year in 1960 that took some of the steam out of the precipitous rise in sand and gravel production in the last decade.

The cautious pessimism of last year's survey returns—which predicted a slight decline in sand and gravel production—has been replaced by a cautious optimism. Sand and gravel producers who answered the ROCK PRODUCTS survey estimated an increase in 1961 production of about 7 percent over 1960. Most of those who projected beyond 1961 anticipate a slightly greater increase in 1962, tapering off once again in 1963.

Part of this anticipated increase will come out of present capacity. Producers who operated at an average of 79 percent of capacity in 1960 expect to increase this figure to 83 percent in 1961. In addition, almost one-fourth of the responding companies expect to add new plants or modernize existing plants in the next three years, with a concentration of expansion in the southern states of Tennessee, Texas, Mississippi and Louisiana.

Where will this increased capacity be sold? Producers hopefully expect that most of it will go into the paving field, which already uses more than half of the total sand and gravel production. About 35 percent of the responding producers see an increase in the highway market in 1961—ranging as high as 80 percent. About 15 percent see an upcoming increase in housing, with a scattering of support for increases in industrial and farm construction. There is no pattern to the market decreases expected. Highways, streets, multiple dwellings, housing and military establishments are all mentioned as decreasing markets, but the decreases are obviously regional in nature. It would appear that the white hope for 1961 lies—in the minds of sand and gravel producers—with the strong resurgence of the federal highway program.

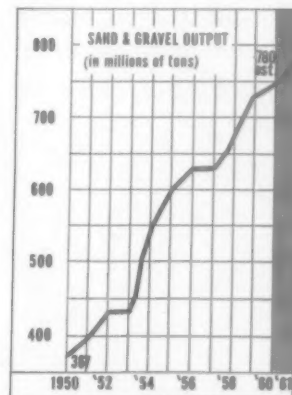
Output per man-hour among reporting sand and gravel plants was remarkably static and actually decreased in some plants between 1959 and 1960. Figures ranged from 4.5 to 20 tons per man-hour (obtained by dividing total production by the total number of man-hours worked). Possibly the most significant point about efficiency ratings is the number of plants failing to report or showing a figure indicating a misunderstanding of what constitutes an efficiency quotient. Only about 35 percent of the plants supplied a reasonable ton per man-hour figure, thus provoking the question of whether or not the yardstick of production efficiency is being laid beside enough sand and gravel operations. Significantly, most of those plants reporting a credible figure expect to increase their efficiency in 1961—by percentages ranging from 5 to 12 points.

Prices generally held firm in 1960—firmer than the producers expect them to hold in 1961. Only about 15 percent of reporting producers raised prices in 1960, while about 40 percent expect to raise prices in 1961. Increases in 1960 were generally slight; in 1961, they are expected to average about 5 percent. More than 90 percent of the producers report they are caught in a cost-price squeeze.

Disappearing profits resulting from soft prices and mounting costs

Sand and gravel: Problems in a growing market

SAND & GRAVEL OUTPUT:
No zip



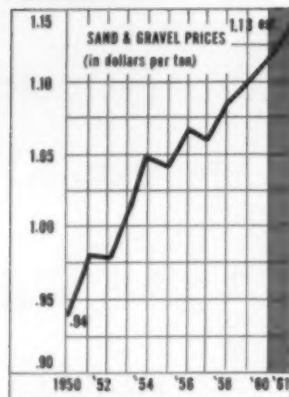
Source: Bureau of Mines, and
ROCK PRODUCTS estimates

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SAND & GRAVEL: PROBLEMS IN A GROWING MARKET

continued from page 91

SAND & GRAVEL PRICES:
Up another notch



Source: Bureau of Mines, and
Rock Products estimates

Producers are generally setting their sights upward in 1961—after a leveling-off year in 1960

was named by the majority of respondents as the principal problem facing the sand and gravel industry. Among the specific factors contributing to the cost-price squeeze, producers listed inflation, rising cost of equipment, prohibitive freight rates and labor. About 20 percent singled out labor as the foremost problem. Other problems mentioned frequently include:

- Increased competition (interestingly enough, the onus was placed not so much on contractor operations as on the growing tendency toward monopoly of markets by large companies);
- Zoning;
- Overcapacity (one producer said sharply: "There is too much productive capacity and too little business acumen exercised by owners");
- High taxes, which prompted this comment from an Illinois producer: "Increased taxes and insurance costs in all fields, plus decreased spread between costs and limited price ceilings make an increase doubtful in any markets;"
- High interest rates, which are holding back housing and small business expansion.

One thoughtful producer, looking beyond his own immediate difficulties said: "Public relations is the greatest problem of the sand and gravel industry. Only through better public relations can we safeguard reserves of sand and gravel to prevent them from being put to other uses. And we can have better public relations only as we maintain quality standards in our product and continue responsible behavior in our communities."

Many specific technological advances were mentioned in the survey returns—among them rod deck screens for washing, nylon belting, use of ammonium nitrate, torque converters, vibrating screen feeders and rubber tired loading equipment. Most of the improvements added up to one over-all point—increased automation. Here, unquestionably, lies one of the major hopes of salvation—providing interest rates and steadily increasing costs will pause long enough to permit further investment by producers in automation equipment.

As one producer said: "Sure, we're caught in a cost-price squeeze; we can't just quit purchasing. So we're going to have to raise prices—or go out of business."

And against this bleak prospect comes the comment of another producer in a different part of the country who says, "We are being ruined by the unrealistic, impossible price of ready-mix concrete in the local market."

Somewhere between these extremes, the bulk of sand and gravel producers are looking forward cautiously to a better year in 1961—a year full of problems, but a better year nevertheless.

Summing up: Increased highway production and regional increases in housing and industrial construction should fortify the sand and gravel industry in 1961. Increases will not be sufficient, however, to subsidize the inefficient operator, and rising costs will continue to favor the large producers and attract the government-contractor operations.

PRODUCTION ESTIMATES FROM LIME COMPANIES responding to the ROCK PRODUCTS survey do not support the expected upward trend of the industry. Some survey respondents expect decreases in production in 1961, and these, combined with other static production estimates, tend to show 1961 production as just about holding even with 1960. This is probably overly pessimistic for the lime industry, but it indicates that 1961 increases for the industry as a whole may be more modest than generally anticipated. All of the reporting companies, however, expect sizeable increases in production by 1962.

In spite of the fact that respondents report only 66 percent of capacity use in 1960, there are still some ambitious plans in the industry to build new plants and modernize old ones. One company, for example, now operating at only 65 percent of capacity will open a new plant in 1961 that will double its production facilities.

Such confidence in the future appears justified. New uses for lime are appearing regularly, and its use is growing steadily in stabilizing bases and subbases in highways and other construction—which should be a booming market in 1961. On the other side of the coin, the lime industry is seriously affected by any cutbacks in heavy industry—where about 70 percent of lime production is used. Thus the present sluggish production of steel is hurting the lime industry.

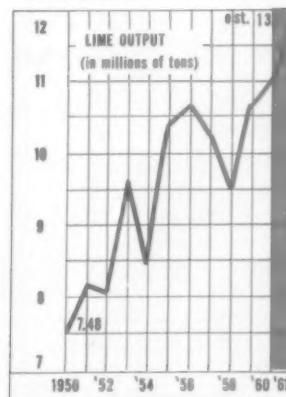
Summing up: More than any of the other rock industries, lime is particularly sensitive to industrial booms and recessions, minor or otherwise. A booming resurgence in heavy industry in 1961 could make it a banner year for lime. Lacking this, steady increases in the use of lime for construction should still provide an over-all gain.



ROCK PRODUCTS, January, 1961

Lime:
Hopes
to hold
its own

LIME OUTPUT:
Will it level out?

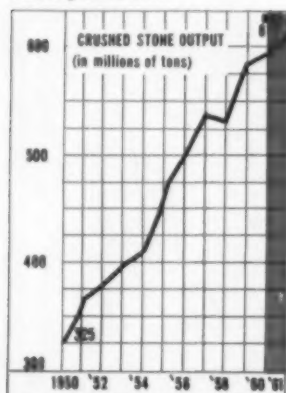


Source: Bureau of Mines, and
ROCK PRODUCTS estimates

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Crushed stone: Operators expect a downturn

CRUSHED STONE OUTPUT:
Has it peaked out?



Source: Bureau of Mines, and
Rock Products estimates

CRUSHED STONE OPERATORS, tied irrevocably to a federal highway program that goes in fits and starts, see things turning down slightly in 1961 despite an expected resurgence in the interstate highway program. This is what respondents in the crushed stone industry reported in their ROCK PRODUCTS survey returns. Respondent producers predict a decrease of about 4 percent in total production in 1961 below 1960. And a majority expect the decrease to continue into 1962!

Why? Let's let some of the producers speak for themselves:

- "Costs are rising out of sight. We must get into automation;"
- "Captive operations are driving us out of business;"
- "Technical advances in customer operations—for example, the steel companies use less fluxing stone by upgrading other raw materials—are hurting our industrial markets;"
- "Transportation costs have increased so far and so fast that our markets are now restricted to short local hauls." To which another producer adds: "The raising of freight and truck rates almost eliminates their use for us. Our customers now have to come and get their own materials."

Increasing costs were mentioned on almost every return, yet—remarkably enough—only about 60 percent of the producers consider themselves in a cost-price squeeze.

Are these pessimistic predictions warranted? Probably not—at least not to the extent indicated on the returns. But they point up the fact that the crushed stone industry is facing a good many basic and serious problems, and some of the producers are beginning to hurt.

More than half of crushed stone production goes into highway construction, and there is every indication that road building will be up in 1961. So will construction over-all. Thus, expectations for crushed stone should be up, too. The pessimism of the survey returns probably reflects to a considerable extent disenchantment with the highway program that floundered so badly in 1960.

Another strong indication that crushed stone producers are not as gloomy about the future as production estimates would indicate is the



sizeable expansion program now planned or underway in the industry. Almost 40 percent of the survey respondents reported new or modernized plants abuilding—most of them, incidentally, of modest size as befitting the new tendency of the industry toward smaller marketing areas.

Here are the highlights of other survey tabulations from crushed stone producers:

- The percent of capacity used will hold steady next year at about 77 percent;

- Efficiency among survey respondents fell far below the expectations in last year's survey. However, the average output per man-hour of 5.81 tons in 1959 improved to 6.4 tons in 1960—and most producers expect to go up again in 1961, some by as much as 25 percent;

- Less than 20 percent of crushed stone producers raised prices in 1960, and about the same percent (but not the same producers) expect to raise them in 1961.

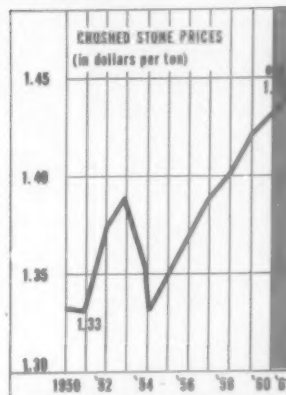
Improved drilling and blasting equipment led among technological improvements noted. Automated devices for the handling and crushing of stone were also mentioned frequently—leading up to what one producer described as “rebuilding to a small, efficient, compact plant.”

Another respondent offered a direct challenge to the manufacturers of crushed stone production equipment when he said: “We have made our plants somewhat more efficient but not due to either recent or imminent technological advances. We haven't heard of anything we would consider a technological advance in recent years except in delayed blasting and rock drilling—neither of which are really new.”

Summing up: Some serious industry problems involving rising costs, captive operations and shrinking market areas have made a good many crushed stone operators gun shy of optimistic predictions. However, an increase in most of the basic markets for crushed stone—particularly highway building—should make 1961 a better year than 1960 for crushed stone operators.

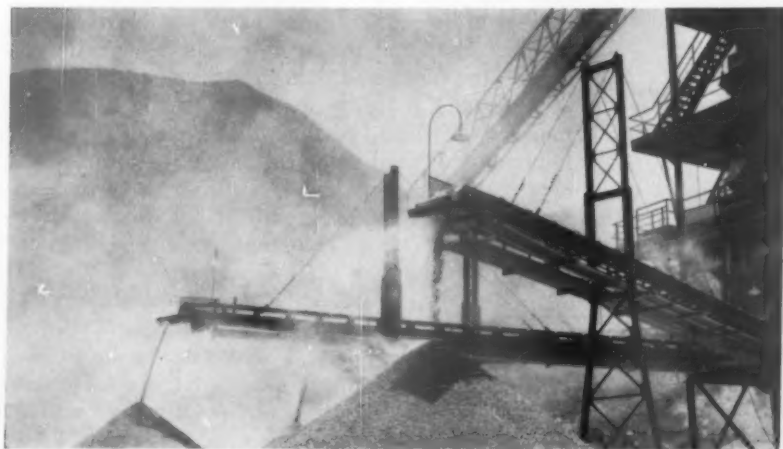
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CRUSHED STONE PRICES:
Holding steady



Source: Bureau of Mines, and
Rock Products estimates

Some serious industry problems have made a good many crushed stone operators gun shy of optimistic predictions for the future





BACK IN STEP IN '61

by Peter B. B. Andrews

THIS YEAR is likely to be one of the top years in the history of the rock products industry. This is the consensus of our Board of Analysts after they surveyed 1961 prospects for the portland cement, sand and gravel, crushed stone, lime, gypsum and lightweight aggregates segments of the industry.

They look for an increase of at least 4 percent more production over 1960's disappointing totals, but still a hefty 1½-billion tons of output. This is in sharp contrast to the deep pessimism that spread so quickly and has prevailed so long after the "Soaring Sixties" failed to go into orbit on schedule.

The outlook for manufacturers and distributors of machinery for the rock products industry is bright, too. That is, unless they develop a defeatist attitude and reduce sales effort in the next few months. Our Board predicts that the rock products industry will need to invest about \$340 million in new plant and replacement equipment to tool up for 1961. That represents about 5.3 percent more than the investment that took place during 1960. Table I summarizes their conclusions.

As consulting economist for ROCK PRODUCTS, I not only surveyed the Board, but since its predictions were so optimistic, I delved deeper into their reasoning. They pointed out that their favorable reaction was based on a number of events taking place simultaneously which would stimulate peak

Experts predict rock products industry to regain its stride after faltering in the past year

demand for both material output and production machinery. Here they are:

- Highway construction will accelerate in 1961.
- Residential construction will perk up substantially over 1960.
- All other construction will make impressive gains to new highs.
- Government construction—Federal, state and local—will expand to match the vigorous increase in population now taking place.

Now let me examine each one of these events in a little more detail.

Strong activity in highway construction is one of the most basic economic factors benefiting the rock products industries. After record spending of \$5.9 billion in '59, there was a decline in 1960 to about \$5.8 billion. The highway programs are now considerably behind schedule. Some of this was caused by technical factors such as slow land clearance; the major part of it simply was a matter of shrinkage of Federal funds. The Board expects that the government will make an effort in 1961 to get the program back closer to schedule. Result: an estimated \$6.3 billion may be spent for highway construction. That would represent a rise of about 9 percent, or half a billion dollars over the 1960 total.

Lagging residential-construction is expected to revive in 1961. The steep slide in housing in 1960 was touched off by the pinch in credit that developed in 1959. The long-term money market has eased considerably during recent months and mortgage funds are again becoming readily available. Homebuilding is important, socially and politically. The federal government can be expected to stimulate residential construction as a counter-cyclical force in 1961.

Our Board of Analysts does not share the belief of some analysts that the United States is overbuilt. In the past two decades about 20 million new dwelling units were started. Almost 4 million of these were created through the conversion of non-residential structures to residential use or the subdivision of larger residences into a number of smaller units. Thus, a total of about 24 million dwelling units were added.

But 5 million units were demolished during this

period, either to make way for other types of construction or because they were beyond repair. The net addition to the housing supply was about 19 million units in the past two decades. There was a net increase in the number of U. S. households of close to 18 million in this same period.

True, there was more construction than household formations. But you must realize that the decade of the 1930's was one of underbuilding during the protracted collapse of the American economy. The accumulated need for new houses was, therefore, carried forward into the 1940's. It becomes evident now that the building activity of the post-war period has hardly caught up with the actual demand for new homes.

Homebuilding starts are not expected to return to the 1959 peak of 1.53 million units. However, the Board believes that a recovery of at least 6

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PROJECTED SPENDING ESTIMATED FOR ROCK PRODUCTS INDUSTRIES
IN 1960 AND 1961 (in millions of dollars)

	1960	1961
Power generating equipment	\$ 45.1	\$ 47.6
Conveying equipment	24.0	25.1
Drilling, crushing and grading equipment	53.3	55.4
Power loading and excavating equipment	40.2	43.2
Trucking equipment	20.4	21.5
Washing and beneficiating equipment	36.2	38.0
New plant	64.6	68.7
Miscellaneous supplies and equipment	38.3	39.9
Totals	\$322.1	\$339.4



As economic consultant for ROCK PRODUCTS, Peter B. B. Andrews has more than two decades of experience and forecasting to call upon. At the same time, he is chairman of the Board of Analysts of Future Sales Ratings. Here, Mr. Andrews transmits the findings of this 311-man panel of industrial leaders after their annual survey of the rock products industry

BACK IN STEP IN '61

continued from page 97

■ *The Board of Analysts believes that the industrious producers of the rock products industries—with sufficient promotional and selling drive—should capitalize impressively in 1961 on some of the biggest potential sales targets they have ever faced*

percent in 1961 from the shrunken 1960 level of about 1.25 million units is likely. Dollarwise, the record high for homebuilding reached \$19.2 billion in 1959. The 1960 level fell to approximately \$17.35 billion, while the 1961 total is estimated to be \$18.4 billion.

Other divisions of the construction industry hold promise for the rock products industry. Industrial, commercial and office buildings, warehouses, stores, restaurants and garages—all strong fields for building in 1960—are expected by the Board to continue to build heavily in 1961. An average rise is forecast. This will be about 7 percent in industrial building, office buildings and warehouses, 6 percent in commercial buildings, and stores, restaurants and garages up about 5 percent.

Religious, educational, hospital and institutional, social, recreational and administrative construction, both private and public, face an improved year in '61. Building here should reach a strong, new record of well over \$8 billion—up about 5 percent over the 1960 level.

The only major exception is farm construction. Even though it is of great importance to many producers individually, it does not loom large in the total picture—comprising 2 percent of the over-all total.

Public spending is expected to be spurred by the downturn in long-term interest rates. States and municipalities now can sell bonds for construction on more favorable terms than any time since early 1959. Federal grants-in-aid and other outlays are expected to be increased as an offset to the slowdown in private economic activity that developed early in 1960. Good gains are expected in water control, conservation and development. Public spending in 1960 dipped, largely as a result of declines in residential, highway and military facilities building. The Board foresees some 6 percent improvement, with public spending in construction approximating \$17 billion.

Total spending for new construction may attain

\$58.6 billion—up about 5 percent over the 1960 level. This, in turn, represented the first decline (one-half of one percent) in 15 years.

Population growth and its buying power augur well for the growth of the economy. The United States now has a record total of more than 181 million people, a figure that the Census Bureau once thought would not be achieved till the 1970's. Population is 3 million higher than it was a year ago, and the increase over the decade approximates 30 million. This is a vast addition to our market, equivalent to acquiring new states the size of Oregon, Indiana, Nebraska, Michigan, Florida and Texas together.

Population increase is not necessarily the answer to prosperity. But in an industrious and progressive nation like the United States, with rising productivity and a substantial level of prosperity, population growth means a great deal. Disposable personal income of the public is at a record high, and the Board expects further gains in 1961. The Board points out, too, that liquid assets of consumers are at new highs.

Consumer spending for goods and services is one strong spot on the horizon—and it is a very important one indeed. Such spending comprises about two-thirds of total national spending from all sources for goods and services.

Just as promising is the growth of business population and the strength of business in the United States. Although growth in the business population has slowed down as compared with the '59 rate of increase, it nevertheless is continuing to advance, and totals of business in this country now are at a new high of approximately 4,730,000 firms in operation. That compares with 4,684,000 a year ago.

The strong and improving financial condition of the business structure of this country is inspiring, too. That indicates an ability to finance expansion and use more of the output of the rock products industries. Net working capital of the nation's corporations, the difference between current assets and current liabilities, exceeds \$134 billion. That is an outstanding new high, comparing with \$128.8 billion at the beginning of 1960 and \$81 billion in 1950.

Considering these influences, the Board of Analysts believes that the industrious producers of the rock products industries—with sufficient promotional and selling drive—should capitalize impressively on some of the biggest potential sales targets in 1961 they have ever faced.

END

Today's theories set tomorrow's practice

PORTLAND CEMENT WAS THE TOPIC of discussion for 270 chemists, physicists and engineers from 35 different countries who met in Washington, D. C., and Skokie, Ill. The 4th International Symposium on the Chemistry of Cement was held under the joint sponsorship of the National Bureau of Standards and the Portland Cement Association October 2 through 12, 1960. The program was prepared by a committee of representatives of the two sponsoring organizations, with Dr. Irl Schoonover of the NBS and Dr. A. Allan Bates of the PCA as co-chairmen.

The meeting in Washington had eight sessions devoted to the formal presentation of papers and discussion. The formal papers were distributed well in advance of the meeting to provide materials for lively and thought-provoking discussions.

More than 100 overseas visitors were guests of the PCA on a bus trip from Washington to Evanston, Ill. On the trip the visitors observed the construction and performance of concrete on the Pennsylvania, Ohio and Indiana Turnpikes.

At the opening session in Washington, Dr. A. T. McPherson, NBS associate director, and G. Donald Kennedy, PCA president, welcomed the members attending the symposium. Dr. Eberhard Spohn, president, Heidelberg Cement Co., West Germany, responded on behalf of the visitors and thanked the sponsors for the excellent program that had been prepared for the meeting.

Dr. Wallace R. Brode, formerly associate director of the NBS and foreign science advisor to the Department of State, discussed "Some Problems

Associated with the Growth of Science." Dr. F. M. Lea, director, Building Research Station, United Kingdom discussed "Cement Research—Retrospect and Prospect."

The remaining sessions at Washington covered the following subjects: (1) Chemistry of Portland Cement Clinker, (2) Chemistry of Hydration of Cement Compounds, (3) Chemistry of Hydration of Portland Cement, (4) Properties of Cement Paste and Concrete, (5) Destructive Processes in Concrete, (6) Chemical Additions and Admixtures, (7) Special Cements.

These and all formal papers and discussions will be published as Proceedings of the 4th International Symposium on the Chemistry of Cement which should be available early in 1962.

There was a reception for members and their wives attending the symposium at the Sheraton Park Hotel in Washington. A banquet was held at the same hotel on October 6 when Ellis R. Armstrong, Commissioner, Bureau of Public Roads, was the principal speaker. He discussed the current highway construction program in this country and cited some of the technical problems.

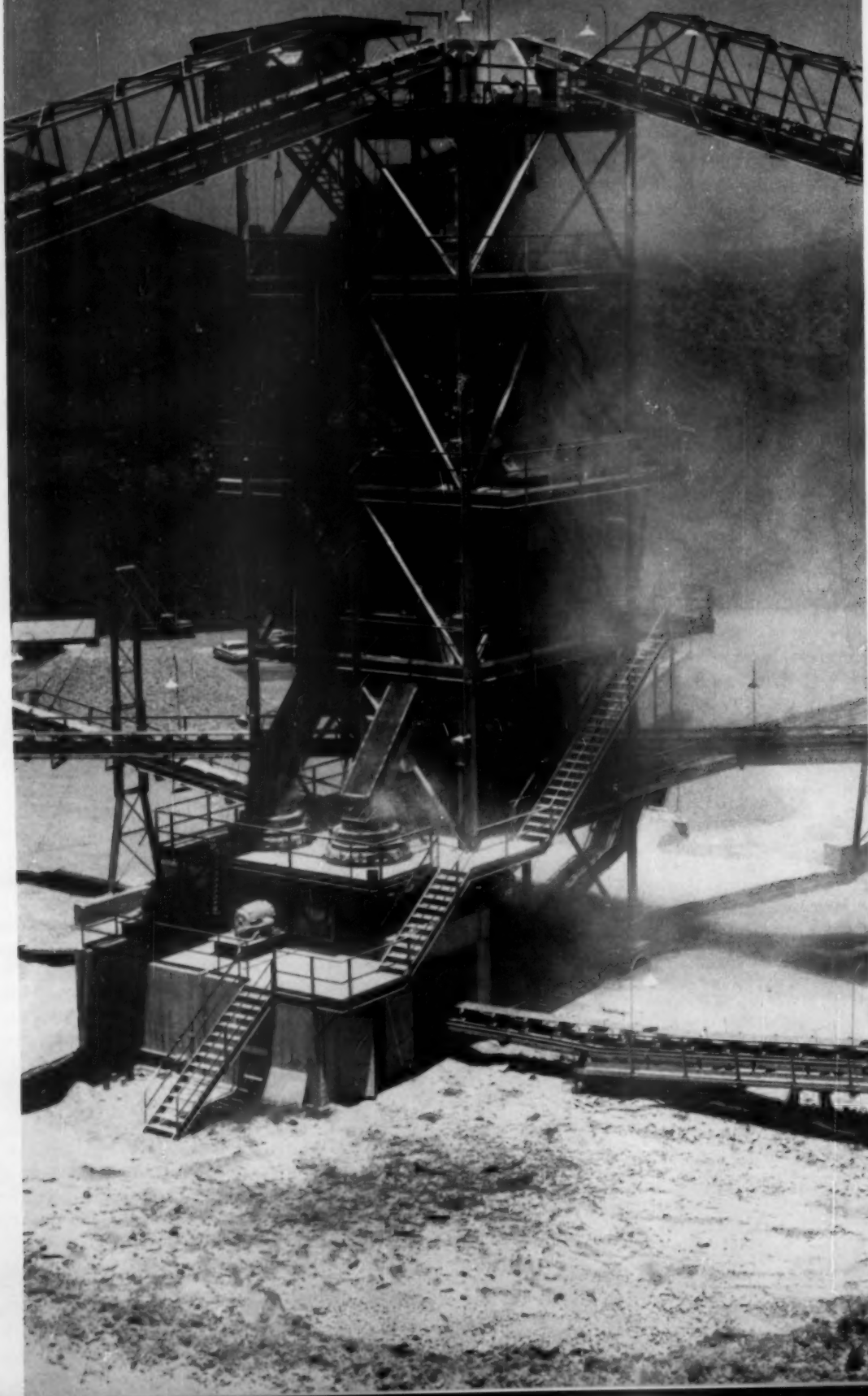
One afternoon was devoted to tours of the laboratories of the National Bureau of Standards and the Bureau of Public Roads.

The sessions at the PCA Research & Development Laboratories October 10, 11 and 12 were a novel feature of the symposium. During these three days a number of seminars were held on subjects of timely interest about the chemistry of cement, concrete and the manufacture of cement. These seminars were informal and they were largely discussions of research and development projects now under way. They included discussions of how research is conducted, a description of new instruments and techniques and how they are used for research.

Throughout the three days at Skokie, a complete open house of the laboratories was maintained. The guests were made entirely at home through guided tours and they were given complete freedom to visit all parts of the laboratories and converse with members of the staff. There was ample time for small groups to gather for the discussion of problems of mutual interest. It is inevitable that these seminars, informal discussion and laboratory visits will provide a major stimulus for future research on the chemistry of cement and concrete.

A number of the foreign members visited the Naperville, Ill., Test Plot of the Long-Time Study of Cement Performance in Concrete and the AASHTO Test Road at Ottawa, Ill.

END



Missile City Rock earns niche in gravel-rich aggregates market

Promotion solves rock dilemma

by John H. Bergstrom

EVER GROPED FOR A LIGHT SWITCH in the dark? Then you know the situation faced by Missile City Rock Co. as it searched for answers to the problems of introducing a new product in a highly competitive field.

The bright idea that rewarded its search is embodied in (1) a 250-tph. crushed stone plant that can be expanded to 500 tph. with little more than the turn of a wrench, (2) a radically different sand plant, (3) aggressive promotion of the products.

Missile City Rock's base of operations is in the Santa Ynez Mountains about 5 mi. south of Lompoc, Calif. This is near the site of the mushrooming missile facilities of Vandenberg Air Force Base and Point Arguello.

As California's only crushed stone operation along nearly 500 miles of coast from Watsonville to San Diego, one of its first problems was one of promotion. Local contractors were used to working with natural aggregates. Lacking familiarity with the use of crushed stone, they had a natural reluctance to make proportioning changes to compensate for differences in workability.

Furthermore, they were reluctant to believe that a deposit in the Lompoc area would supply high-quality aggregate. The area is characterized by deposits of extremely soft materials that cannot meet the rigid specifications of its principal markets—the government missile facilities.

These objections were checked off by Missile City Rock's effective promotion of its assets. Contractors were convinced that its deposit, contrary to most local experience, contains a top-quality dolomitic limestone. Los Angeles rattler

tests showed results between 13.8 and 18 percent loss. Sodium sulfate loss proved to be less than .5 percent, and specific gravity varied from 2.72 to 2.82 percent.

Another problem in initial stages of development was the production of specification sand from a low-quality river deposit. This, too, was solved by a simple low-cost beneficiating method.

To meet these organizational problems as they came up, the company was fortunate to have operating personnel with broad experience in the crushed stone field. A great deal of this experience is reflected in the excellent design of the plant. Both W. Neil Richardson, general manager, and Gordon S. Forbes, general superintendent, lived at the plant site throughout the construction period and kept close check on the smallest details.

Please turn page

LEFT: An 85-ft. screening tower with its pair of cone crushers is the heart of Missile Rock's dolomite limestone processing system

RIGHT: Every month a big blast scalps another 40,000 tons from the mountain peak



PROMOTION SOLVES ROCK DILEMMA

continued from page 101

Design of the plant called for their top-management experience. Obviously, production costs had to be competitive with local river gravel. This dictated a large-capacity installation, but an uncertain market made it out of the question. The resulting design is a happy mating of the two alternatives, rather than a compromise.

The present rock plant has a capacity of 250 tph. and produces six different products. The primary crusher, all structures and all material-handling systems can handle 500 tph. Doubling plant capacity requires only replacing the two existing cone crushers and adding two more screens. The existing crusher bases were designed for the larger units, and space has been provided for the two additional screens.



After these few changes, the plant will be able to produce 500 tph. with the additional bonus of a split flow. This is an important extra that will simplify maintenance, as well as afford greater latitude in the number of materials that can be produced simultaneously.

Permanent loading and stockpiling facilities were not provided because of marketing uncertainties. Present arrangements consist of ground storage of the six products and truck loading by front-end loaders. When experience has dictated the number, size and volume of salable products, permanent reclaim and truck-loading facilities will be constructed.

The crushing plant is located directly below the rock deposit. Two benches are currently being worked. Three and one-half inch holes are drilled on a 12-ft. grid to a depth of 20 ft. One stick of dynamite is used to spring each hole, which is then loaded with ammonium nitrate for the actual shot. Each shot loosens about 40,000 tons of rock—a month's supply under normal operating conditions. This system, one of several tried, has proved both effective and economical. As a result, blasting costs are far below original estimates.

The shot rock is gouged loose by a 2½-cu. yd. shovel, bull-dozed over the cliff to the plant level, breaking the heavy rock to smaller sizes. A front-end loader scoops rock up from the talus pile and drops it into a 30-cu. yd. hopper. Below the hopper an apron feeder passes the rock to a double-deck vibrating grizzly. Plus 5-in. oversize from the top deck goes to a 30 x 42-in. jaw crusher. The crusher product that joins the minus 5 x 7/8-in. material from the second deck is conveyed to a 22,000-ton surge pile. The throughs, which are mostly overburden, are conveyed to a waste pile. Some of this waste is later blended with base material to produce greater compaction.

A 36-in. conveyor draws material from a reclaim tunnel under the surge pile and delivers it to the

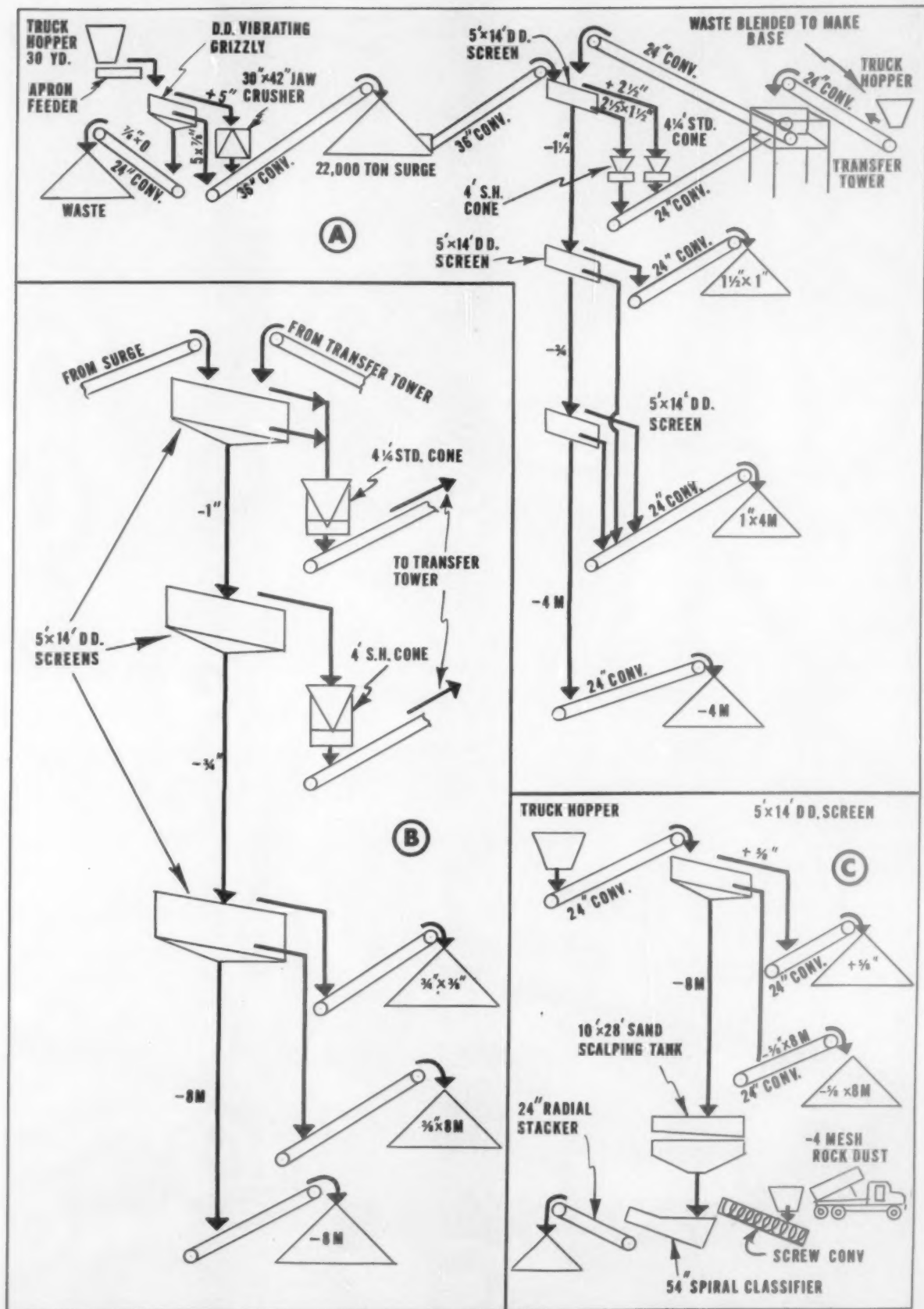
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LEFT: A huge talus pile is formed by rock pushed over the edge of the quarry to the shovel far below

FLOW SHEET "A"—Production of concrete aggregates follows this layout to make three sizes

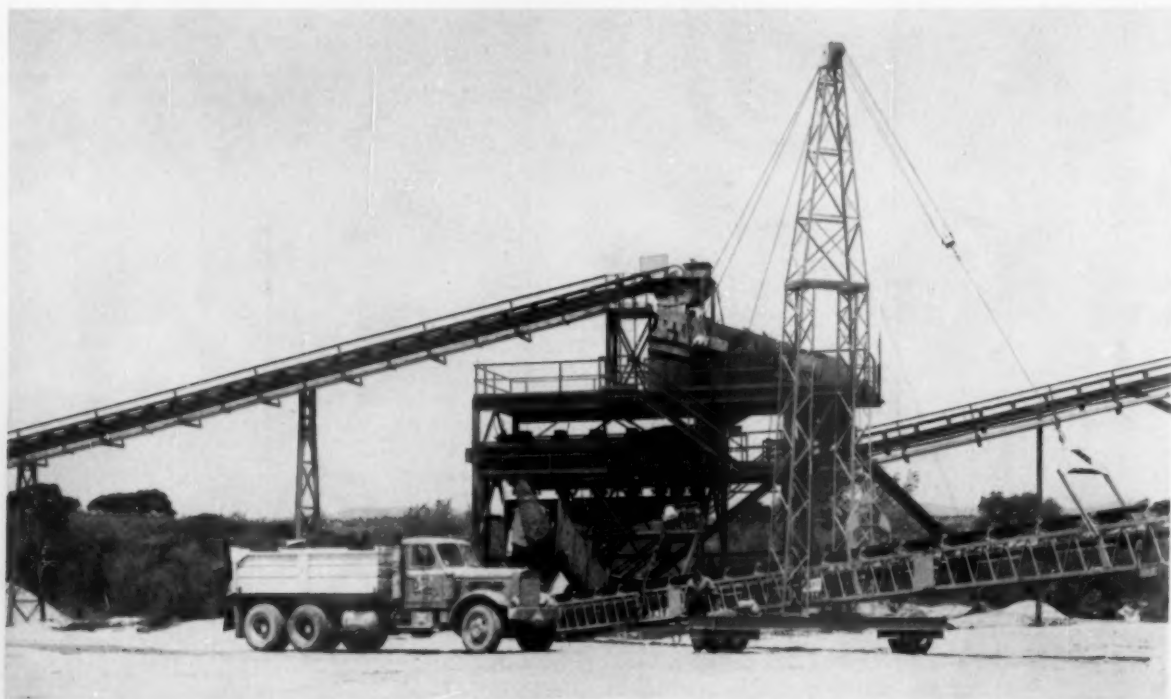
FLOW SHEET "B"—Three sizes of aggregates for bituminous concrete are made in the same equipment but stored in separate piles

FLOW SHEET "C"—Washed specification sand is an exceedingly important product at Missile City Rock





THE 250-TPH. CRUSHED STONE PLANT looks exceedingly small from the mountain-top quarry



WASHED STONE SAND is effectively managed with a radial stacker

PROMOTION SOLVES ROCK DILEMMA

continued from page 103

top of the 85-ft. high screening tower. Here it encounters the first of three identical 5 x 14-ft., double-deck screens.

Identical screens in both the rock and sand plants were specified for easy stocking of screen cloth and repair parts. Though these screens must handle a wide range of material, more than 90-percent efficiency has been achieved by varying the angle of the screening surface. The angle of the rod-mounted screens varies from 12 to 22 deg.

Flow through the screening tower varies with the type of material produced. For concrete aggregates, plus 2½-in. rock from the top deck of the first screen is chuted to a 4¼-ft. standard cone crusher. The 2½ x 1½-in. material from the second deck goes to a 4-ft. shorthread cone. The product of both crushers is conveyed to a transfer tower and then back to the screen closing the circuit.

The throughs from the first screen drop to a second screen. Material retained on the top deck (1½ x 1 in.) goes directly to stockpile. Oversize from the bottom deck of this screen and both decks of the third screen is combined and conveyed to storage as a 1-in. x 4 mesh product. Throughs from the third screen are the last product.

To produce asphaltic aggregates material flow is altered, but no change in screen cloth is necessary. Oversize from both decks of the first screen is sent to the standard cone crusher, and oversize from both decks of the second screen to the shorthread cone. Products of both are recirculated.

The third screen makes three products: ¾ x ¾ in., ¾ in. x 8 mesh, and 8 mesh x dust. In addition to the smaller crushed product there has also been a demand for riprap, slope protection stone, and filter rock (minus 3 x 1½ in.). Orders for special stone have been filled as far away as Los Angeles, nearly 100 miles.

The sand plant operated by the Missile City Sand Co., an affiliate, is located on the banks of the Santa Ynez River about 8 mi. from the rock plant. Sand from this deposit will not meet rigid state and federal specifications without beneficiating. "Fortunately," says Neil Richardson, "when we made careful tests of the deposit we found that all the light deleterious material, mostly shale, was in the plus 8-mesh size range."

This suggested a simple method of beneficiation. All natural sands larger than 8 mesh are screened out and replaced by minus 4-mesh rock dust. The

blending ratio is about 25 percent dust to 75 percent natural sand.

How well does it work? Well enough that recent test reports show the blended sand has less than ½ percent deleterious material and shows 118 percent the strength of Ottawa Sand in a mortar strength test.

The sand plant has a rated capacity of 150 tph. It is intentionally simple in design because at the time of construction the deposit was unproven.

As in the rock plant, a 5 x 14-ft. screen is the principal sizing unit. Plus ½-in. oversize from the top deck is conveyed to storage and sold as filter rock. Sand from the second deck contains the deleterious material and is sold as a nonspecification river sand. The minus 8-mesh throughs are treated in a 10 x 28-ft. sand scalping tank to remove a belly in the 30 to 50 mesh range.

The scalping tank discharges into a 54-in. spiral classifier. In addition to its usual function of washing and dewatering, the classifier also is used to mix the minus 4-mesh rock dust with the natural sand from the scalping tank—rock dust is fed to the classifier by a screw conveyor. The classifier is a larger unit than would normally be required to carry the necessary capacity, but it is operated at half the recommended speed to save more fines.

END

MAJOR EQUIPMENT REFERENCE

ROCK PLANT	
Drill	Gardner-Denver Co.
Compressor, 600 cfm.	Ingersoll-Rand Co.
Crawler drill	Northwest Engr. Co.
Shovel, 2½-cu. yd.	Allis-Chalmers Mfg. Co.
Dozer	Mixermobile Mfg. Inc.
Front-end loaders, (2) 4½-cu. yd.	
(1) 3½-cu. yd.	
Apron feeder	Kennedy-Van Saun Mfg. & Engr. Corp.
Vibrating grizzly, 2-deck	Simplicity Engr. Co.
Vibrating screens, (3) 5 x 14-ft., 2-deck	
Jaw crusher, 30 x 42-in.	Pioneer Engr. Div., Poor & Co.
Vibrating feeder	Syntrotron Co.
Cone crushers, 4¼-ft. standard	Nordberg Mfg. Co.
4-ft. shorthread	
Conveyor idlers	Stephens-Adamson Mfg. Co.
Motorized head pulleys, (7½-hp.)	Western Conveyor Co.
Conveyor belting	Quaker Rubber Div.
Gear reducers	Falk Corp.
Scale, 70-ft.	Howe Scale Co.
Structural design	Arthur E. Howland Co.
SAND PLANT	
Dragline, 2-cu. yd.	Harnischfeger Corp.
Vibrating screen, 5 x 14-ft., 2-deck	Simplicity Engr. Co.
Sand scalping tank, 28-ft.	
Spiral classifier, 54 in. x 34-ft.	Eagle Iron Works
Screw conveyor	Hurt Conveyor Co.
Radial stacker	Kolman Mfg. Co.
Conveyor idlers	Stephens-Adamson Mfg. Co.
Motorized head pulleys, (7½-hp.)	Western Conveyor Co.
Conveyor belting	Quaker Rubber Div.
Gear reducers	Falk Corp.
Scale, 70-ft.	Howe Scale Co.

Pitfalls await the unwary who are lured by monumental gravel deposits

Mountains of placer debris promise cheap and easy gravel

by Walter B. Lenhart

ALL THE GLITTER has been taken out of the mountains of gravel that dot the landscape in California's Mother Lode country. Not only all the gold, but all the values that would make them good aggregates. Practically every stream that flows westward out of the Sierra Nevada has these man-made eskers—unsightly monuments to nearly a century of digging or dredging for gold.

It's quite natural for cost-conscious citizens to look on these endless gravel banks as a cheap and easy source of aggregates. There is no doubt about the amount available. There is probably more of this debris than aggregate producers in the rest of the United States have dug since the beginning of time. But the general public is innocent of the pitfalls that lurk in the indiscriminate use of this seemingly harmless gravel.

Now it will probably be more difficult than ever to prevent the uninitiated from leaping at the op-

portunity to use these bonanzas. Super highways, airports, rocket launching pads and a vast array of dams have put an almost irresistible pressure on public officials to specify this placer gravel as a source of concrete aggregates.

Before we say why spoil bank gravel is not the treasure trove it seems, let's see how it came to be. Then, perhaps, the point will prove itself.

Gold dredges are mostly of the ladder type that can dig as deep as 110 ft. below water with a 50-ft. bank above the water line. However, the most accessible piles are in the lower reaches of the gold-bearing streams where the ladder worked a 70-ft. deep deposit with a 5-ft. bank above water—a total of about 75 ft. When solid, well-compacted gravel is dug, it will "swell" about one-third. In this case, the debris pile would be approximately 100 ft. high.



THIS IS THE WAY dredge banks came into existence—coarse gravel is piled at the rear of the dredge. Sand tailings build up on the bottom far under the dredge

THE BUSINESS END of a big dredge gnaws away at the compacted alluvial deposit, often as deep as 100 ft. below the surface



The continuous line of buckets on the gold dredge discharges directly to a large trommel screen, a rotary screen that usually has 1/2-in. perforations its entire length. Recoverable gold is in the sand fraction. After the gold is removed, this sand is dumped back into the pond almost directly under the dredge. The coarse fraction—and it often contains boulders 15-inch. and larger—is discharged to a wide stacker belt conveyor in the stern of the dredge. In this way, the coarse material is dumped on top of the sand.

If the original deposit was 40 percent minus 1/2-in., our situation would look like the sketch. There would be 40 ft. of sand at the bottom of the pond and 60 ft. of gravel on top. Only 25 ft. would be above the water line. This 25 ft. of rubble will hardly have a trace of sand in it since "... large potatoes always stay at the top ..."

Practically everyone who has gone into this has found that he is not in the gravel business but in crushed stone production. For anyone who knows his business, this has meant additional crushers and a high degree of flexibility in the screening setup to get the necessary gradation. Sometimes it has meant installation of high-capacity rod mills or even ball mills, or both, along with intricate sand recovery equipment, liquid cyclones and what not. The producer winds up with a coarse and fine aggregate that is harsh and low in workability.

A rod mill will take up to 350-hp. for the mill alone. Along with closed-circuit screens, pumps and buildings, this can easily add up to \$100,000 for invested capital alone. The inexperienced have often turned this fine grinding section over to the nearest laborer. This has been a serious operational error: An experienced "mill man" is needed to

run that part of the plant. This dismal situation might have been avoided by digging virgin gravel in the first place.

It might be well to see if all the gravel in the area was processed. Very probably there are many benches of virgin material remaining that were out of the way of the dredges. And this material may have 5 to 10¢ per cu. yd. of easily recoverable gold in it—gold that can be recovered with practically no added expense. A recovery of 10¢ a ton from 1,000 cu. yd. every hr.: that's \$100 per hr.

How to recover it? Ask your mill man. He will show you how.

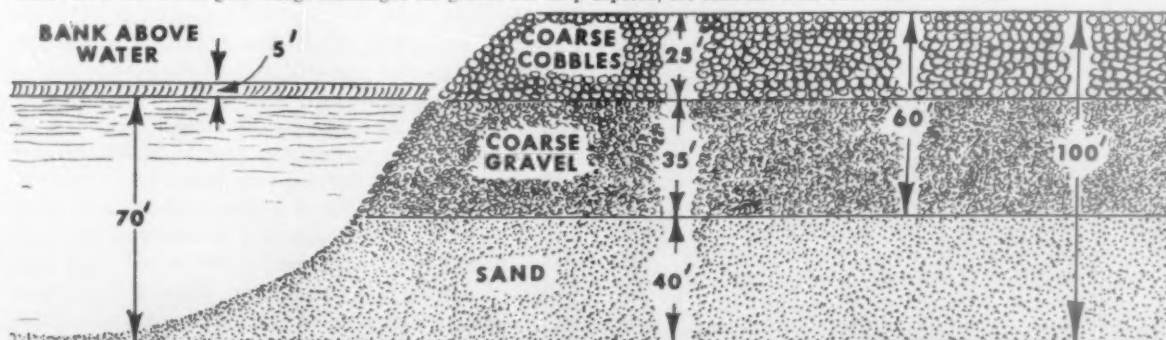
You will have a lot of fun doing it, and this may really put some substantial "glitter" back into the job for you. However, landowners in the area may want pay for the yellow metal, so some negotiations may have to be done.

Now let's see some of the difficulties that have been encountered in processing these mountains of gravel. A dam having about 2-million cu. yd. of concrete was involved. Due to extremely poor gradation, harsh sand, and other factors directly traceable to the debris piles, the engineers in charge for the owners said, "We will pour the first 25,000 cu. yd. of concrete using what you have to offer. If there is no improvement after that, you will have to add another 50 to 75 lb. of portland cement to each yard of concrete ..."

If this had been carried out, the contractor would have had to buy some 1.5-million extra bags of portland cement. That cash outlay would buy a lot of sand and gravel, or pay for a lot of good engineering advice on gravel processing. As it turned out, the contractors scrapped, rebuilt and re-arranged several plants, all at great extra

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HERE'S HOW the normal gold dredge rearranged the gravel. For deep deposits, the sand has been buried far out of reach

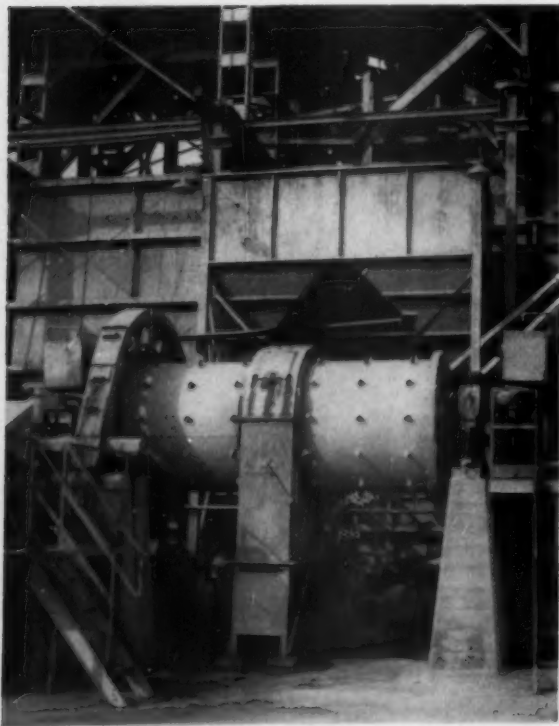


MOUNTAINS OF PLACER DEBRIS

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PORTABLE PLANTS have been used to reclaim gravel from dredge tailing banks



ROD MILLS have been successful in manufacturing fines from gravel, replacing natural sands which were lost in original processing

expense. The builders would have been far better off to dig virgin gravel and process it in a plant designed by experienced and qualified aggregate engineers. A new contractor soon learns that a gravel plant is not just something that he can throw together, even when he's not trying to work with dredge tailings.

At another location where an unquenchable optimist was working a gravel bank, a portable dry crushing and screening plant was used in the pit. This was located several miles from a second and more elaborate plant. A large tonnage of unwanted oversize material was wasted just as we have described. Gravel above the water line was run through the portable plant, and the finished product was trucked to the larger plant where several more crushings and a rod mill were required. Eventually a battery of liquid cyclones was added to the assembly, and elaborate screening flows were arranged. The five sizes of aggregates including sand were stockpiled. This material was trucked a second time to bunkers where it was fed to a long conveyor system serving the concrete batching plant.

It is a wonder that the gravel was not all worn out from the many and intricate handlings. That it cost money goes without saying. It is entirely possible that the methods used were the best and only ones possible. We use it only to illustrate the extreme difficulties of processing these "cheap" sources of gravel.

Under these circumstances, it is obvious that if sand is needed, all of it will have to be manufactured. Specially designed types of cone crushers have been used successfully, but in the past rod mills have pre-empted the field.

One producer of my acquaintance needed a total of 185-tph. of minus $\frac{1}{4}$ -in. sand including 5-percent minus 100-mesh. His pit and plant could supply less than half of this; so to get the additional fines, a 350-hp. rod mill was installed. This reduced about 51½ tph. of pea gravel to minus 100-mesh. Now a rod mill will grind adequate tonnages of $\frac{1}{4}$ -in. material, but the sand is usually top-heavy in the 20 to 50-mesh range. These large sizes must be removed and re-circulated through the rod mill. But for anyone who knows the pitfalls, there are ways of licking almost any problem. Then it's just a question of whether the solution is the most economical. We'll still say that dredge debris is a wonderful place for amateur aggregate producers to learn the business—fast.

END

Inclined drilling techniques promise savings to quarry operators

Tilt your drill— improve efficiency

by Dr. Boris J. Kochanowsky*

THE VERTICAL BOREHOLE IN QUARRY FACES, which is the common practice today, may give way to those that are inclined up to 40 deg. to the vertical. Mathematical calculations, scale-model experiments in the laboratory and large-scale tests in active quarries tend to prove the advantages of the inclined drilling method.

Estimates now are that savings in drilling and explosives costs are roughly one percent for each degree of hole inclination. More research is needed to get final proof, but enough is known now that the outlook for savings is most optimistic.

Inclined drilling, generally, can be used under all conditions encountered in quarrying and surface mining. Rock structure, though, may have some effect on its use. Studies show that the inclined method requires less footage of drilling per cu. yd. of rock than a vertical hole. Machines that can drill inclined holes up to 5½ in. in diam. are now available. Rigs designed to drill holes of much larger diam. will be on the market soon.

Our wide experience with the application of inclined boreholes before World War II created a desire to conduct research on the method, to determine its relative effectiveness compared with the use of the vertical hole. Knowledge gained through research and discoveries of many techni-

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*Dr. Kochanowsky is affiliated with the Department of Mining, College of Mineral Industries, Pennsylvania State University. This is a condensation of a paper delivered at the Colorado School of Mines (10th Annual Drilling & Blasting Symposium) in October, 1960. The full text will appear in the *Colorado School of Mines Quarterly*, Vol. 56, No. 1, January 1961.

National Gypsum photo



TILT YOUR DRILL

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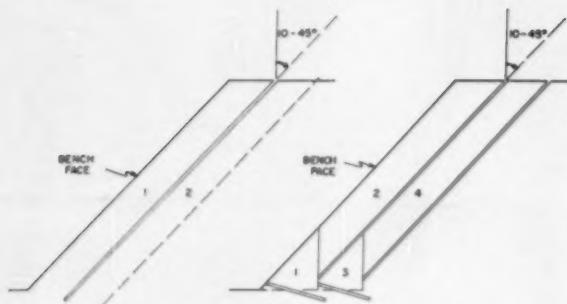


FIG. 1—Layout of inclined-hole drilling on a bench

cal and economical advantages of inclined drilling led to promote the idea and introduction of the method to several mining companies here and abroad.

Rock quarries and other open-pit operations used various patterns of vertical and inclined holes, or combinations of them, in bench mining before World War II. Investigation of the cost of these types showed that the inclined hole, such as that in Fig. 1, was the cheaper. It has been used in limestone and dolomite quarries on benches from 100 to 360 ft. high. Boreholes 1½ to 2 in. diam., 20 to 35 ft. long, were drilled at an angle of 45 deg. to vertical.

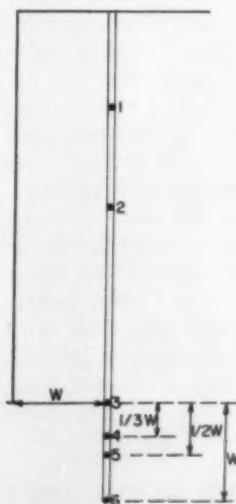
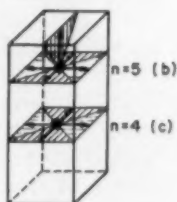
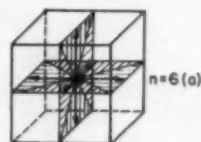
The powder factor for these inclined holes drilled on high benches was 15 to 17.5 tons per lb. of explosive which was half gelatin and half ammonia dynamite. The small amount of powder used may seem unbelievable, since in most American quarries the factor varies between 2 and 5 tons per lb. In this example, though, the following factors were important: Small borehole diam., small burden and spacing between 12 and 18 ft., strength of explosive, high ratio of bench height to burden, favorable rock structure, direction of bench face, and small rock resistance at the toe due to selected borehole pattern. The last factor is of particular importance.

Why can inclined boreholes produce better blasting efficiency? There are three major reasons: (1) higher rate of available explosive energy used for fragmentation, (2) less rock resistance against blasting at the toe of the bench, (3) larger part of the borehole can be loaded with explosive.

It is known that a much smaller loading factor is needed to break a boulder than to blast a bench with vertical boreholes. Boulders, assuming they are of cubical shape, have 6 free faces compared

to 4 to 2 free faces in bench blasting. Fig. 2 shows the loading factor for limestone boulders, also for various locations of explosive charge along a vertical borehole in a bench blast. Variation in the loading factor is due primarily to the number of free faces. These data can be explained easily with the use of available blasting theories. Structure of the rock and other factors that may affect the blasting results and the loading factor are disregarded in these data. But it is well established that a stronger, costlier explosive is needed at points 3 and 4 (Fig. 1) than at points 2 or 1.

An inclined borehole pattern and loading factor used for calculation of explosive charges is given



No.	n	Loading Factor Index	Assumed example in limestone		
			L. F.	P. F.	
			gm./t	lb/cu. yd.	t/lb
a	6	0.167	8	0.036	56
b	5	0.2	10	0.044	45
c	4	0.25	12.5	0.056	36
1	2	0.5	25	0.1	18
2	1	1	50	0.22	9
3	0.5	2	100	0.44	4.5
4	0.35	2.9	150	0.66	3.9
5	0.25	4	200	0.88	2.3
6	0	∞	∞	∞	0

FIG. 2—Loading Factor (LF) and Powder Factor (PF) as a function of the number of free faces

in Fig. 3. Data are based on actual operations in various quarries over a period of years. They confirm the assumption that the loading factor in inclined boreholes may be smaller due to reduced rock resistance at the toe of the bench, and to better use of explosive energy.

Detonation of explosives generates shock waves that propagate through the material in all directions. A reflected shock wave, if strong enough, will produce a fracturing of rock mainly by tension. Figure 4 shows the area of influence of shock waves produced by detonating charges at L on vertical and inclined boreholes. In this diagram, rock enclosed in the area ALB forms a 90-deg. angle at point L, sides AL and BL being at 45 deg. to borehole direction. These angles are chosen arbitrarily, but results would be similar if other angles were selected. Only half the shock wave is reflected in the vertical hole 4a; 50 percent of shock wave energy is lost. About 72 percent of the energy is used in case 4b, and all of it may be used for rock fragmentation in 4c, the 45 deg. inclined hole.

Blasting experiments in the laboratory of the Department of Mining, Pennsylvania State University, showed more evidence and justification for the application of inclined boreholes. Plexiglass models, 4 x 9 x 11-in. in size, and lead azide explosive were used in the experiments. For scal-

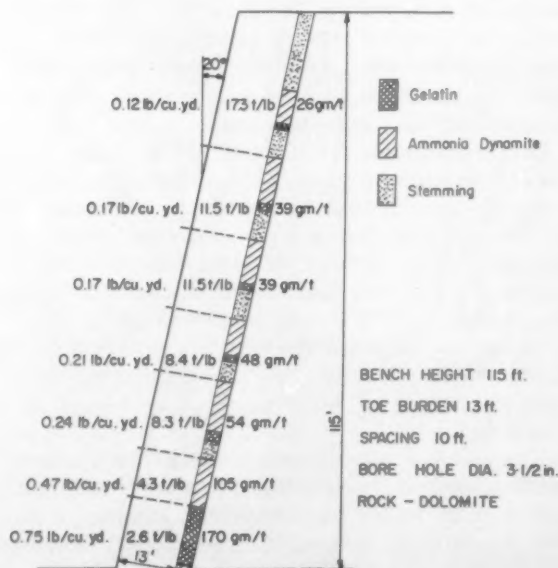


FIG. 3—Powder and Loading Factors along the bore hole

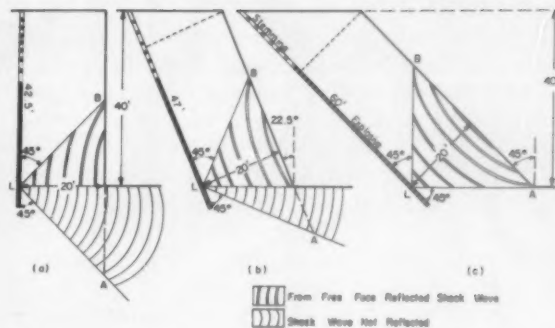


FIG. 4—Shockwave propagation through rock generated by detonation of explosive charge located at point L

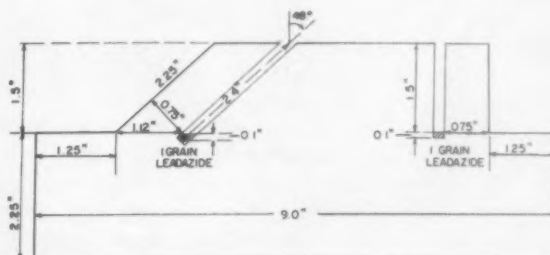


FIG. 5—Cross-section indicates dimensions of the blasting tests using leadazide in plexiglass



FIG. 5A—Here, the results of detonating leadazide in plexiglass using both vertical and inclined drilling

ing and economy reasons, it was decided to use a bench of 1.5-in. height and a .75-in. burden. Boreholes were .172-in. diam. and were drilled vertically, inclined at 45 deg. and later at 48 deg. Length of the borehole depended on the bench inclination and sub-drilling depth, which usually was .1 deep. Result of one of the tests is shown in Fig. 5. Here are the test conclusions:

1. Only a small volume of plexiglass was broken in two cases of vertical holes using 1.08-gr. ex-

Please turn page

TILT YOUR DRILL

continued from page 111

plosive charges. Burden was not broken when 1.00-gr. charges were used.

2. Boreholes inclined 45 deg. and 48 deg. to the vertical always broke a large burden, in spite of the fact that the loading factor of an inclined borehole was 1.5 to 2.2 times less than in a vertical hole.

3. The toe was broken in all blasts with inclined boreholes even though sub-drilling depth was .1 in., only 13 percent of the burden. This depth in quarries and open pits usually is 25 to 33 percent of burden length.

4. Excellent effect was obtained even though length of both vertical and inclined boreholes was the same. For a specific bench, the inclined hole is naturally longer.

5. Explosive force in vertical borehole tests appeared to be "trapped," or showed difficulty in breaking through the material. The opposite effect was noted on inclined borehole tests.

6. Data calculated from tests show that the weight of the plexiglass blasted is consistently affected by the angle of borehole to the vertical, by the distance from the third free face to the borehole, and by the weight of the explosive charge.



BIG DRILLS can be used for inclined bore holes

It is not claimed that the experiments give answers to all questions related to the application of inclined boreholes. But they do give excellent examples of explosive force action and fragmentation of homogenous material by explosives. Additional research is planned. Different types of materials will be broken in the laboratory, using static and dynamic loading separately and combined in both vertical and inclined holes. Yet, all conditions encountered in surface mining cannot be simulated in the laboratory. Hence, large-scale research in open pits and quarries is needed to determine factually the advantages of inclined drilling under various conditions.

Savings can be obtained with the use of the inclined drilling method. But until additional research is conducted, it is dangerous to determine just how much. To date, tests on a large scale show a 20-percent saving in drilling and explosive costs on a borehole drilled at 20 deg. to vertical. Laboratory tests show good results with 1.5 to 2.2 less loading factor on a 45 deg. inclined hole than for a vertical hole. It would appear, based on present information, that cost savings may be in the order of 1 percent per deg. of hole inclination, and that savings increase directly proportional to the degree of inclination.

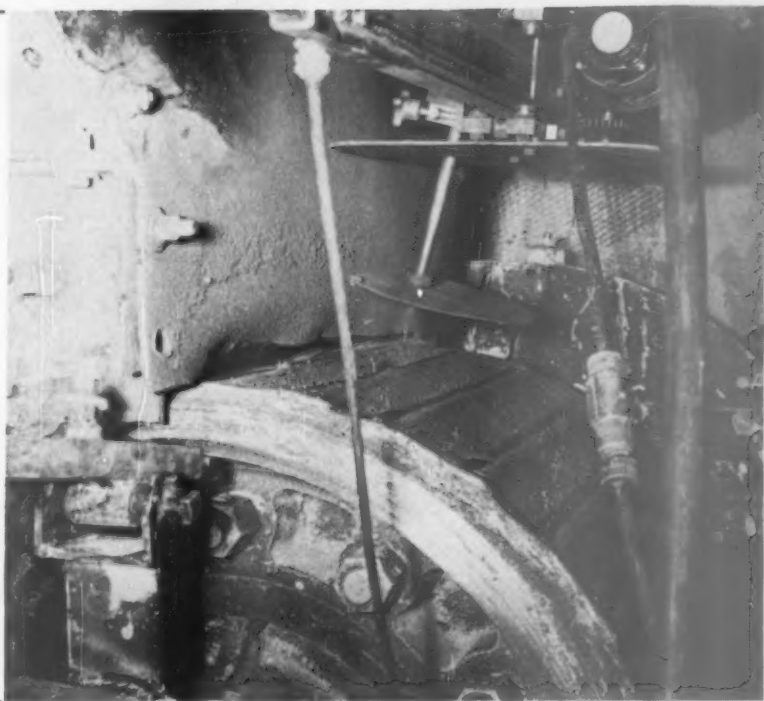
Where can inclined drilling be applied? In general, it can be used under all conditions found in surface mining. Structure of the rock may have some effect on its use. The method could improve the powder factor or decrease footage drilled. Where toe problems exist and fragmentation is poor, or where rock structure causes undesirable back breakage, the inclined hole method may be used to eliminate these problems.

Best results can be obtained from using the method on high benches. Vertical boreholes often produce excessive back break, which can be caused by the rock structure or by too heavy a burden in relation to bench height. Reaching a certain bench height, the borehole diameter of an available drilling machine might not be large enough to place sufficient explosive in the borehole to break the burden without leaving a toe. These problems have been eliminated at some quarries by use of inclined drilling.

The number of companies using the inclined drilling method is constantly growing. Those that use it claim better fragmentation, elimination of the toe problem and safer operation. It is suggested that the method will be used widely in quarrying and surface mining in the future. **END**

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rebuilding
and hard-facing
crusher rolls
in position!



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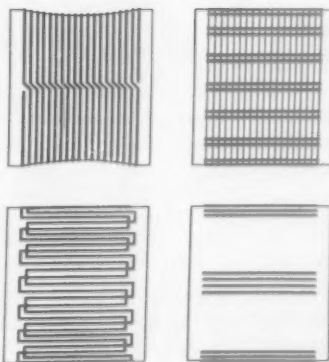
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an independent slow-speed roll drive. Crushermatic deposits up to 20 lbs. per hour, utilizing a standard semi-automatic wire feeding unit and power supply capable of 100% duty cycle. Deposits are sounder and more uniform than with manual or hand-held semi-automatic application.

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A wide range of weld patterns can be set up with the electronic controls for rebuilding any specific wear problem.

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ROCK PRODUCTS, January, 1961

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113

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*Constant speed of kiln rotation is first essential
of stability in portland cement production*

How "equilibrium" solves kiln problems

by Donald L. Derrom†

WHY DOES A CEMENT PLANT need to have its kilns on constant-speed operation? The answers are legion. Boiled down to lowest terms the aim is simple. What any cement plant needs is perfect equilibrium.

A rotary kiln on portland cement possesses an equilibrium for each type or grade of product. It cannot be forced beyond that point. It should al-

ways be on the maximum production that coincides with equilibrium.

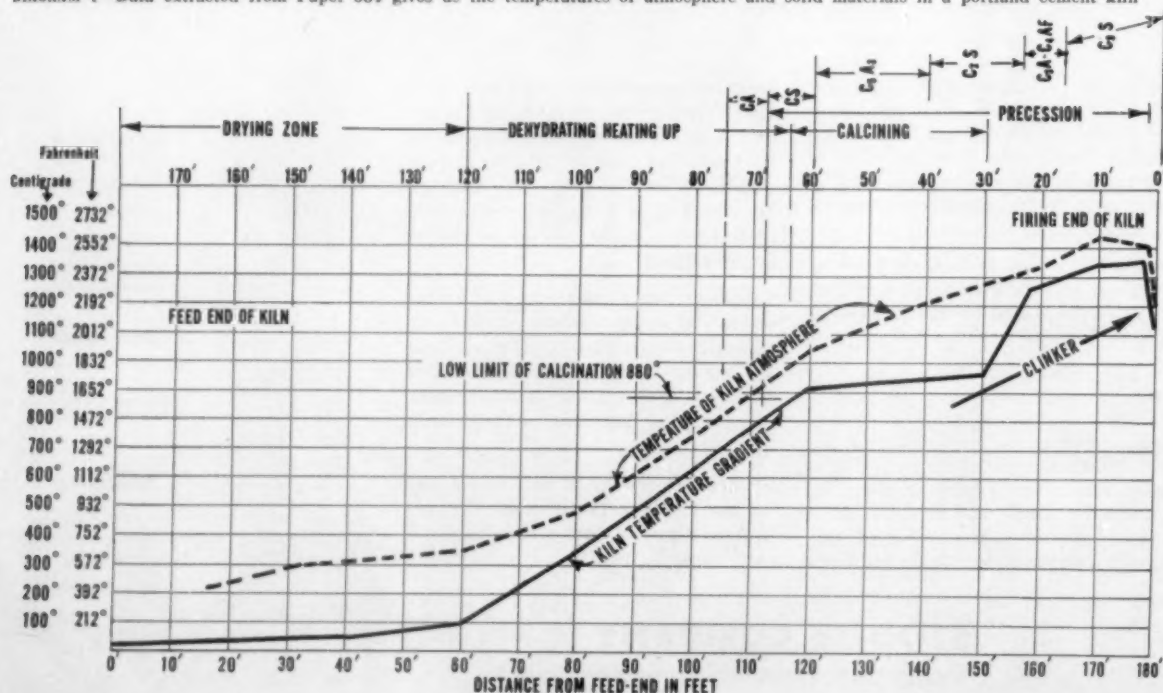
Any sound system of kiln betterment depends on what I call the "trend" system of guiding control. What trend seeks is purely and simply process equilibrium. This system is sound. This is because it works to a planned base line, or a definite end-product. It aims to keep the flowing stream of cement materials to within a defined tolerance. Thus, constant speed's real utility is to aid and abet trend. As a matter of fact, it forms the "point" or

Please turn to page 116

†Engineer, 1701 Sixteenth St., N.W., Washington 9, D.C.

*See, also, Parts 1 & 2 of Safaris in Cement, *Constant-speed kilns pay off*, and *Let's scrutinize silica*, October and December 1960 ROCK PRODUCTS, pages 103 and 99, respectively

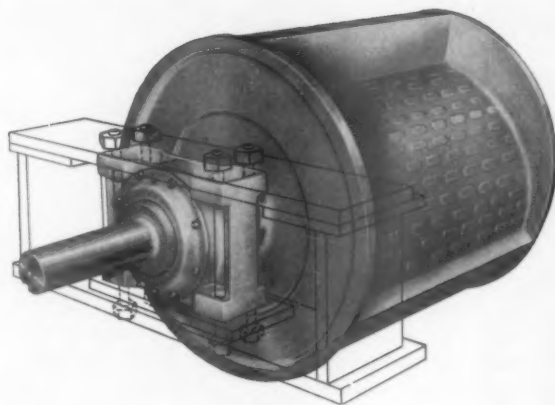
DIAGRAM 1—Data extracted from Paper 384 gives us the temperatures of atmosphere and solid materials in a portland cement kiln



HIGH REDUCTION RATIOS with HIGH CAPACITY



KENNEDY DUAL-ROTOR IMPACT BREAKERS



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- primary and secondary reduction in one operation ... because of their higher capacity, fewer machines are required.
- use of the principle of true, controlled, free impact ... rock is shattered along the lines of natural cleavage.
- simple, inexpensive maintenance ... truly effective use of wearing parts keeps output and product quality high.

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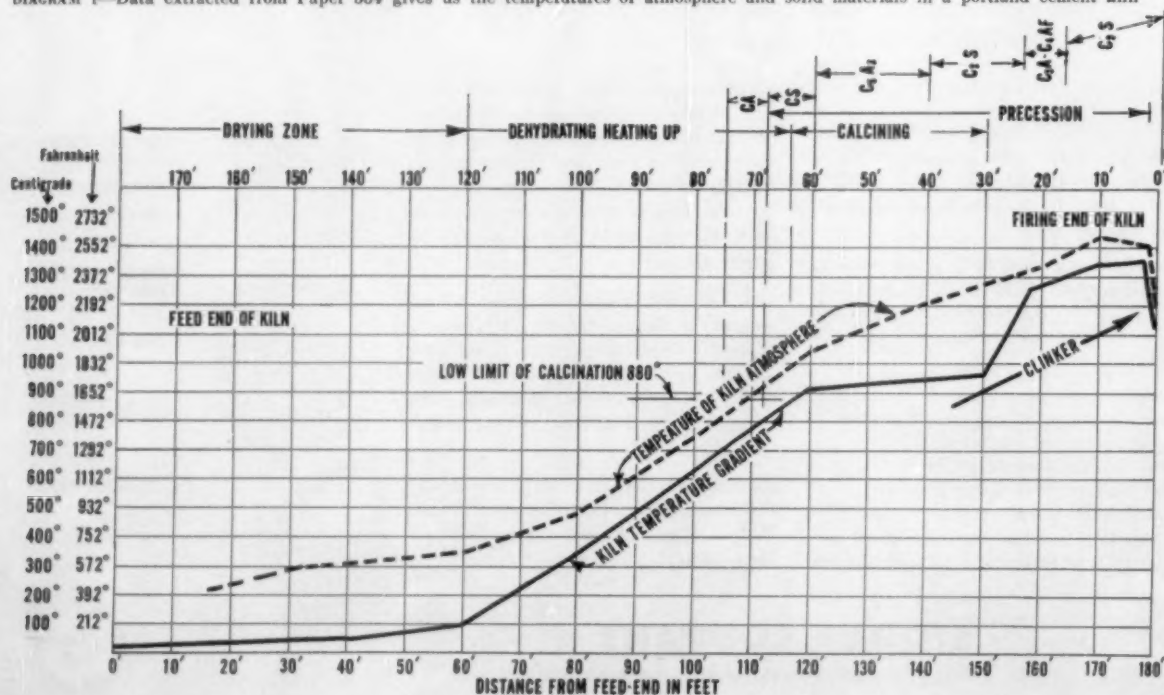
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Case Model 750 tractor-shovel...

1 $\frac{3}{8}$ cu. yd. (heaped); 1 $\frac{1}{8}$ cu. yd. SAE Rated capacity; 11,000 lbs. breakout; 16,000 lbs. lift; 23,000 lbs. crowd; max. dump ht. of 8'; forward reach over 43" at 7' ht.

or Power-Angling Dozer

gives you hydraulic blade angling, up to 25° right or left — on-the-go.

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NEW CASE 750

The one-size tractor "most wanted" by the majority of crawler users! Powered right, priced right; with all the "big-rig features" you need to handle a wider variety of both large and small jobs at highest net profit.

Here, at last, is a versatile, big production crawler that is truly engineered for the competitive 60's. Compact, rugged, yet surprisingly economical to own and operate, the 72 hp diesel Case 750 offers big tractor features and lower price, plus a new concept in serviceability.

**World's Most Effective
Tractor Transmission**

Job-proved on Case crawlers since 1955, the exclusive, hydraulically-operated Case Terramatic® transmission gives the "750" unequalled maneuverability and handling ease. You get split-second power-shifting, effortless power-steering, plus independent power control of each track. You just touch a hydraulic foot brake to make sharp pivot turns — *no hand or foot clutching!* Or you can operate one track fast, the other slow to turn gradually with *full power* on *both* tracks — a big advantage when you're moving heavy loads in mud, cutting along hillsides, turning trailing loads on downhill runs.

One-Hand Tractor Control

With just fingertip pressure on

handy hydraulic controls, you reverse direction without clutching... change speeds from high to low, low to high "on-the-go". This easy one-hand operation — combined with exceptional power, speeds to 6.6 mph, and elimination of time-wasting motions — enables the Case 750 to handle a wider variety of work at highest net profit per job.

A New High In Usable Power

The "750" is powered by a 301 cu. in., Case-built diesel engine — proved in over 15 million hours field use. Also, the "750" is equipped with "load-sensing" torque converter that instantly, automatically adjusts power to changing loads and tractive conditions. Result: the "750" moves bigger payloads at higher average speeds — without clutching, shifting, or stalling.

Long-Life Track System

Proven on larger Case units, the "750's" track system is designed to take the punishment imposed by fast, non-stop cycling. You get up to twice the work output of ordinary crawler tracks.

Exclusive Case torsion suspension absorbs shocks... increases traction... keeps bucket or blade level — even when the front of one track is raised as much as 10 inches higher than the other.

**Easy Access, Simple
Maintenance Cuts Downtime**

To mention just a few of the "750's" downtime-cutting features — there's hydraulic track adjustment, automatic roller lubrication, swing-out grille guard, tilt-forward cowl and dual fan belts.

Get the facts from your Case Industrial Dealer now. Ask to see the sound and color action movie on the new "750". Learn why this "years-ahead" Case crawler loader or dozer will help you increase your profits this year as well as throughout the competitive 60's.

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SAFARIS IN CEMENT

continued from page 114

"line of departure and reference" for trend, throughout the process. What we now know and will go on to confirm, is that constant speed is the foundation of equilibrium in the process.

Trend's greatest difficulty is with the kiln. Twelve or more important operations proceed inside the running kiln. They are out of sight, reach, checking or measurement. They depend upon pre-entry factors and post-kiln clinker analyzing. Many disturbing influences come and go. They are all met by constant-speed material maneuvers and combustion control. This last is mostly automatic in action. Manual combustion direction is then used only in emergency.

Let us digress for only a moment. Recent research unexpectedly turned up the scientific, empirical and practical information that confirmed

these conclusions. This was an old and respected paper entitled "Flow of solid particles through Rotary Cement Kilns" (Technical Paper 384, U. S. Bureau of Mines, Dept. Comm., 1927). Its object was primarily for "Design Guidance," and its value for operation techniques completely ignored. Its value was masked in a tangled jungle of poorly presented data. We cleared it by making a cross index. It was "a Safari of good hunting." Diagram I gives the applicable data we abstracted—more will be utilized later. The reader should study this table carefully.

In this diagram, kiln dimensions—length, diameter, slope—are fixed for any one kiln. Until recently, the speed has been considered by the industry generally to be a variable. But it is clear that variable speed creates a "family of variables" that hinders trend, and with it, production stability. If we hold speed to any constant rpm., the "family" is eliminated and all four dimensions become constant. This proves to be a step of maximum importance. It sets up a constant kiln characteristic and opens the door to equilibrium.

We turn now to other variables—rate of feed, depth of bed and weight per unit of surface area—their interpretation is important. For example, "time of passage of solid particles through a rotary kiln is independent of the rate of feed." At

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TABLE I—Formation of various compounds in portland cement

No.	Compound symbol	From T ₁ deg. C.	To T ₂ deg. C.	Observations
1	CA	?	800	
2	CS	800	900	
3	C ₂ A ₃	900	950	
4	CS	950	1,200	
5	C ₂ A	1,200	1,300	Liquid appears
6	C ₂ AF	1,300	1,400	

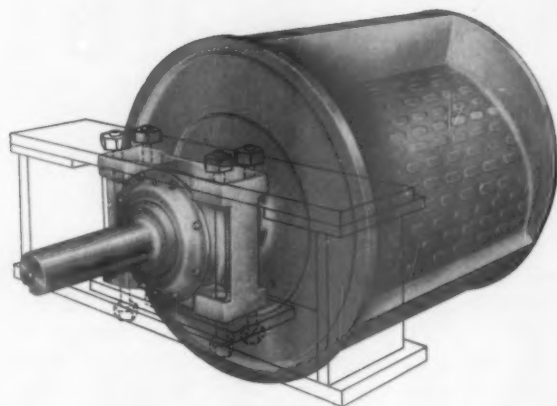
TABLE II—Abstracts from Technical Paper No. 384, Bureau of Mines

No.	Factors		Rule of conduct, or influence on study of passage of material through kiln
	Names	Symbol	
1	Length, ft.	l	Time through rotary kiln varies directly as length
2	Diam., ft.	d	Time through rotary kiln varies inversely as diam.
3	Slope, deg.	p	Time through rotary kiln varies inversely as slope in deg.
4	Speed, rpm.	n	Time through rotary kiln varies inversely as speed in rpm.
5	Feed rate	O _r	Time through rotary kiln varies independent of rate of feed (?)
6	Bed depth	B _i	Only effect of rate of feed is upon depth of bed. Increasing feed raises "bed height"
7	Wt./Unit surface	w _s	Lessens when bed height increases
8	Repose, angle	θ _r	Running varies with wall roughness, diam., slope, speed of kiln, material by granulometric analysis with sizes, shapes, weights, density, smoothness; and for temperature and "air slide effect" of steam in drying and dehydration, and by CO ₂ gas emerging in calcination. Later the repose angle tends to reverse, due to chemical combination in the precession of formation of silicates and aluminates
9	Speed flow in kiln travel	N _k	Speed of travel is influenced by drying, dehydration, calcination and temperature in increasing sense. It is slowed partly by draft, obstructions and by formation phase. The "algebraic sum" may only be detected by trend and careful analysis. Constant speed, uniform and accurate feed and bed height are seen to be vital
10	Constrictions		Constrictions are of two kinds: (1) Built in by design, (2) Results of operation, such as clinker wall-accumulation, clinker-rings (mud-rings in wet process)

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SAFARIS IN CEMENT

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first, this statement appears innocuous, even unimportant. Consideration shows it to be priceless; it's of maximum importance to kiln understanding. It was brushed off nonchalantly by two curiously worded statements in the paper. "The only effect of feed is to give a deeper bed of material in the kiln," and "Of course per unit weight of material—the surface area exposed to kiln gases—is lessened, when the rate of feed is increased." The more we studied these items, the greater their importance proved to be.

Now in microfeed we have an "open sesame" to an understanding of rational kiln operation. The value of constant speed is accentuated and substantiated. Trend control has been vindicated and given added impulse.

That there is such a thing as indeterminate flow was proved at Oslo, Norway, in 1955 by the use of radioisotopes: "materials fed at the same time pass through a kiln at different speeds." We add another concept. There is no such thing as a bed of material in a kiln. There is a semi-fluid stream of granular material rolling up, over and down on the upturning side, slowly and irregularly advancing down kiln as it rotates.

Now back to trend. When feed is drastically increased, the material piles up near the feed pipe. Then it advances down kiln like a slow and rising tide. If feed is drastically cut, it appears from the feed end to be like a receding tide. In a 200-ft. kiln, the tide may take 200 min. or more to reach the discharge end. A constant-speed kiln is a machine which is by nature steady, resistant and unresponsive to rapid change. We should try to cultivate that tendency, not go contrary to it. Our thesis should be clear now. With constant speed frozen, feed alone affects stream size. Thus, stream quality regulation should be given attention when all else is constant.

Feed may be closely controlled by "duplex feed" as we term it. This consists of two accurate feed elements. These could be screw feeders, one feeding 80 percent and the other 20 percent. The first

volume is fixed, the second easily adjustable in small increments over the full range. Trend now begins to adjust the volumes of raw mix to the needs of the steadily running kiln and produce equilibrium. To keep it, all material tolerances from beginning to end must be tightened.

It is now clear why the best old-time kiln operators were calm, careful, slow to act and seldom blamed their troubles on the mix. There is always an uncertain period at change of shifts. There is plenty for an intelligent burner to do to get the most out of a constant-speed kiln. He can be shown that a kiln is a narrow, long tank. Anything he does to the material at one end takes hours to appear at the other and even then may be quite changed.

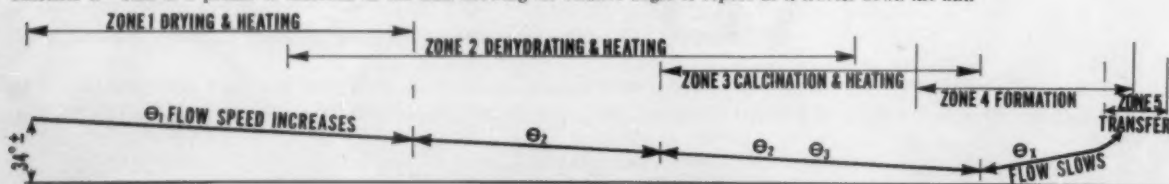
We now sense the fallacy of attempting to adjust a running kiln by speed and feed changes. We watch, instead, the lime analysis from the laboratory as well as the liter-weight clinker control.

Then calm, unhurried action in cooperation with trend is all that is needed. We found kilns to have a certain inherent capacity to adjust to minor differences. This is where the value of automatic combustion control comes in. It is now the only really quick-acting variable left. Just the same, it works for kiln constancy. It adds the firing zone ambient temperatures algebraically, which a human burner cannot do.

Let us mentally go inside a rotary. Before we do, we will construct a hypothetical one. It shall be a plain, dry system, with ordinary, standard equipment. It is being fed a perfect mix of ideal materials; operation at constant speed and duplex feed. It may be on any fuel, with control of combustion and temperature by ambient radiant pyrometer and working on controlled natural draft at sea level. The cooler is of a grate type, controlled by timer from the platform. Secondary air control from cooler throat is by pyrometer to cooler fan and dampers. Primary air and fuel is controlled from combustion ambient by optical pyrometer. With this setup and the usual indicating and re-

Please turn to page 120

DIAGRAM II—This is a profile of material in the kiln showing its relative angle of repose as it travels down the kiln



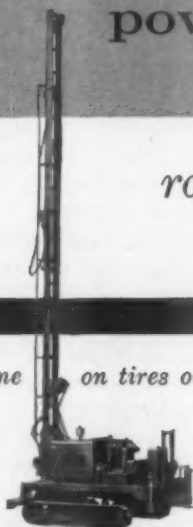
LE ROI LRD-2

for low cost,

powerful rotary drilling

*rotary or down-the-hole drilling
... gas or diesel*

These rigs come on tires or tracks!



Here's a highly portable blasthole drill for drilling holes up to 4½ inches as deep as 30 feet... equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

What's more, the LRD-2 is completely self-contained... and economically priced, too!

The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, mast hydraulically raised, drill pipe and bits connected, and hole started all with a few non-fatiguing motions.

Powerful direct mechanical drive keeps the rotary table turning — won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough

rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations.

A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole... or is available in single-stage where only rotary drilling is necessary.

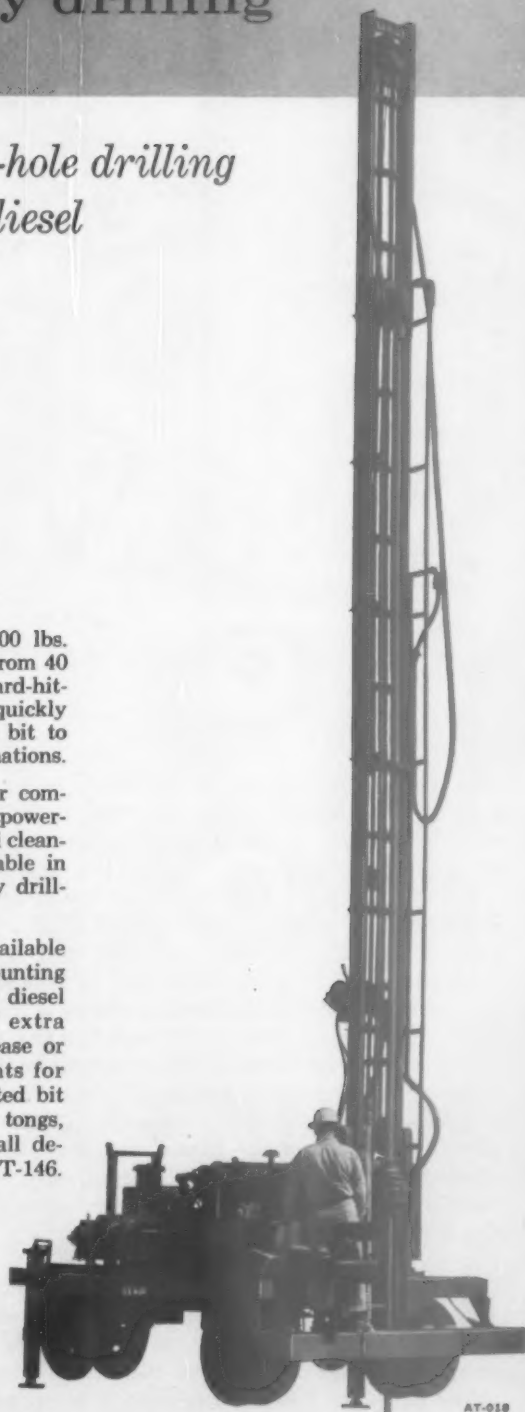
The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, ... all detailed in Specification Sheet AT-146. Write for your copy.



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AT-018

SAFARIS IN CEMENT

continued from page 118

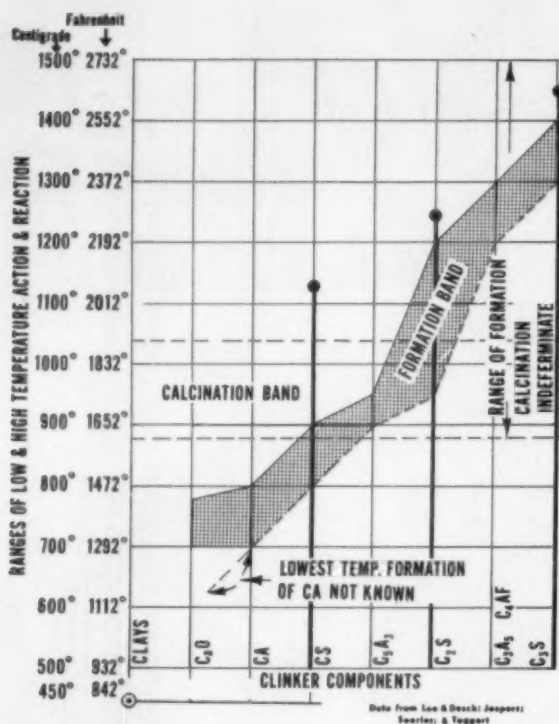


DIAGRAM III—Reaction temperature at which the components of cement clinker form within the kiln

cording instruments, we are now ready to investigate certain kiln conditions. We wish to find out what modifications are introduced, how they fit into concepts advanced for general kiln operation.

We can now discuss the angle of repose of the raw mix. Heat influence progressively changes the value of θ (theta) for each material. As Diagram II shows, it is not a clear cut step-by-step affair but intermerged. First, there is drying then dehydrating of clays; this is followed by calcination of the calcium carbonates. These actions progressively increase fluidity and speed of the flow. In all three stages, there is a measure of "air slide effect." It is raised by steam and then by CO_2 coming off. Heat itself has some fluidizing influence. This is our tide, flowing ever faster down the kiln.

Finally, two obstacles are encountered. The first is formed by agglomerated clinker wall coating. This produces what Paper 384 calls a "long constriction" which both raises the bed height and slows down the flow. Before this, heat action has speeded flow by lowering the angle of repose, θ .

From now on, it will raise angle of repose and slow the flow down. The long constriction of coated firing zone follows approximately the same laws as the full-sized kiln as to diameter, length and slope, but now the calcined material arriving is now much less in volume and weight. Thus, if the coating is controlled, production will not be throttled down. In fact, a reasonably reduced diameter holds back material as a dam and gives compensation in that way to hold a bed or stream height; within limits it can be a legitimate constriction.

Constant speed and accurate feed control the firing zone coating. If not cared for, this can be an embarrassing and costly matter with variable speed. We know from experience that constant speed effects the vital reactions.

As the calcined mix reaches a certain position, components of the final clinker begin to form. To help visualize this, we have Diagram III. This portrays the relation of time temperature and reaction. When the heat bands of lime cross the alumina and silica, they initiate combination.

The diagrams and Tables I and II, show clearly how the precession range of formation temperatures fit neatly under the "umbrella" of kiln temperature gradient. Because these final reactions are exothermic, they support rather than detract from the gradient. At the same time, they are prevented from flashing into chain reaction on a large scale. This is because the rolling action of the kiln holds back material temperature rise. It only presents a moving shell of material to heated gases for a moment. As the moving surface heats, it gets rolled under the load. Slow running with frequent starting and stopping permits chain reactions and is more often than not the cause of rings or balls. Constant speed never produced balls and rings; generally they form from non-constant speed, a wild mix or residual fluxes from the fuel that force a kiln beyond equilibrium.

Mixing by roll-over, also going on at the same time, is a slow, steady affair. The turning over of the mix and sudden subjection to surface heat, gives an opportunity for early reactions to start and yet not go too fast or too far. Before about 1,600 deg. F., no lime is yet calcined. So formation of CA and CS compounds cannot proceed until past 1,600 deg.

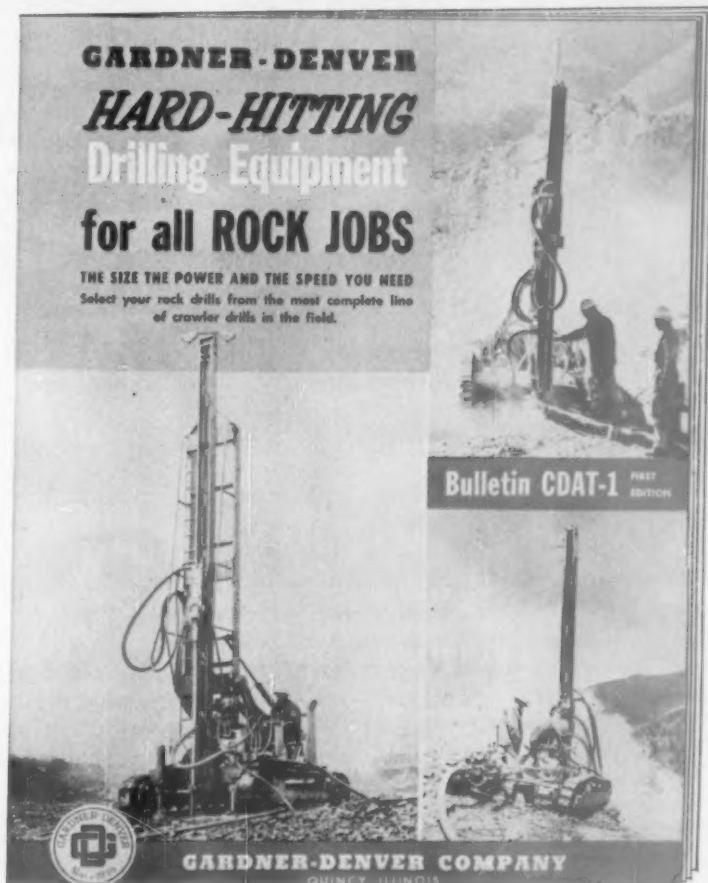
The delaying sobering action of time and the restraining action of the rolling mixing are beneficial. They bring the six components virtually closer to precession. This is an important concept to grasp. We have found in practice that the closer to the hood that the clinkering zone is, the more ad-

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*Slowdown at steel mills reduced available slag for processing in 1960
Look for same quantity in 1961*

Raw material shortage plagues slag industry

THE SLAG INDUSTRY HAS A REAL PROBLEM—and it's unique to the current rock products industry. There simply isn't enough slag to satisfy growing markets—markets that were developed during the period of increasing slag output from steel mills. Cause of the shortage, of course, is the decrease in operating rate of blast furnaces in the steel industry, which produce slag as a by-product. In one area, only 7 out of 17 furnaces were in operation during November 1960.

What to do about operating in such a situation was one of the main topics of discussion at the 43rd annual meeting of the National Slag Association, held at the Mayflower Hotel, Washington, D.C., November 3, 1960. The annual meeting of the NSA Board of Directors was held the following day at the same location.

The big problem to slag processors is how to make a profit on operations in a condition of forced reduction in operating rate when competition is increasing. NSA's president, Charles W. Ireland, summed up the industry predicament with a Pennsylvania Dutch expression: "The pie is all, but the cake is yet." An interpretation may be that the profits in the slag business are lost for the moment, but the market is good.

Area reports of NSA directors on present and projected future status of industry gave an excellent picture of the country's industry as a

whole. The consensus was that 1960 was a poor year compared to 1959. One area reported a decline in volume of 30 percent in 1960; another reported a capacity to process 60 percent more than the available slag supply. A director for a third area reported that his company would be completely out of slag in two weeks.

As to 1961 operating prospects, virtually every area expected business to be at a rate comparable to 1960. There was one exception. Canada did a record business in 1960, and expects 1961 business to be at a lesser rate because of declining government expenditures on construction.

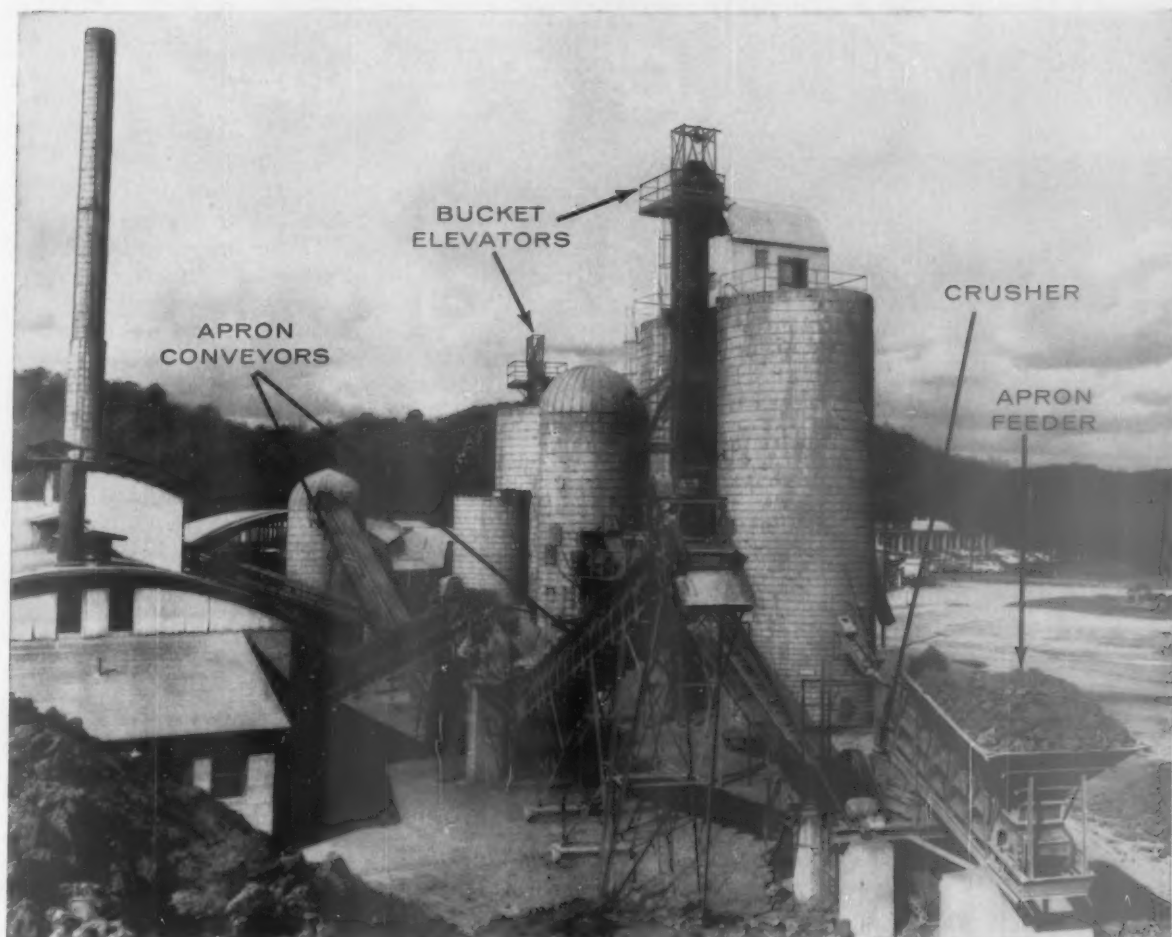
But the industry is not sitting idly by, just waiting for the raw-material supply situation to improve. Here are some recommendations made to improve the operators' present situation, and also to maintain the possibility of future expanded markets:

- Upgrade product to increase realization from slag available for processing.
- Become more quality minded; you can't risk complaints.
- Look to the possibility of using open-hearth slag. Experiments have been successful.
- Develop structural market for slag products; aim for 20 percent expanded slag sales in this market.
- Accent service in selling to customers.
- Exploit the natural advantages of slag as an aggregate.

Two specific recommendations pointed to the challenge the industry faces and the action necessary to meet it. One operator admonished: "We don't have slag to supply all markets, and probably won't get it. It's time to stop feeling sorry for ourselves about a shortage of slag. We must adjust to it." Another, whose plant is sitting in the middle of many sand and gravel and crushed stone plants, had this to say: "It's good to be vulnerable. It will either shake you up or shake you out."

Report of NSA's chief engineer, D. W. Lewis, detailed the progress that has been made in technology, several important research projects and through constant contact with national technical societies, federal and other agencies. He outlined progress on the following research jobs: (1) Chemical, petrographic and physical properties of slag. (2) Resistance of slag to freezing and thawing. (3) Slag block characteristics. (4) High

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SLAG INDUSTRY PLAGUED . . .

continued from page 122



NSA'S FIRST AWARD is presented to retiring research director Fred Hubbard by G. Lanier. Mr. Hubbard served the association 31 yr.



GAVEL CHANGES HANDS: Incoming President Edward C. Levy, Sr., receives gavel from retiring president Charles W. Ireland



NSA NOTABLES at head banquet table (left to right): George Lanier; Edward C. Levy, Sr., incoming president; E. W. Bauman, managing director; H. T. McIlwain, presiding; Nello L. Teer, Jr., guest speaker; Charles W. Ireland, retiring president; Fred Hubbard, retiring research director, and Stewart H. Staffey, luncheon speaker

strength of slag concrete. (5) Alkalinity and acidity tests of slag and water solutions. (6) Autoclave corrosion. (7) Iron in slag aggregate.

Two recommendations for improved service to members by the engineering department were made: (1) Prepare, during the coming year, a number of letters or interim reports to supplement technical and engineering information on several projects that formerly were reported only at the annual meeting. (2) Ask cooperation of industry members in supplying data on location, procedures, methods used to overcome problems on construction projects where slag aggregate was used.

NSA is particularly active in furthering the interests of its members. Managing director, E. W. Bauman, presented to the group a 22-page report on activities of the association conducted since the last meeting.

Highlights of the report show: (1) The managing director and/or the chief engineer actively participate on 40 committees of 11 national institutes, associations or societies in behalf of the slag industry. (2) The Washington office effectively handled at least one request for information on slag each working day during 1960. (3) In the interest of assistance on industry problems, every member company was visited at least once during the year by either the chief engineer or the managing director.

A charge and a challenge was given the group at a luncheon meeting by Stewart H. Staffey, United States Steel Corp. As he sees it, the future of the industry will be beset with many changes and brand new problems. One of them will be a change in the chemistry of slag. These changes could, he believes, increase abrasion resistance, reduce acceptability for cement, alter weight and affect expandability.

Slag supply will be another problem. Slag produced per ton of iron today is only one-half of that normally produced before World War II. Yet, since an increase in output of molten iron is expected, slag available for the next five years should about equal that produced in the last five. He expects the steel industry to operate at 62 to 75 percent of capacity during 1961.

How to solve these problems? Mr. Staffey's key is new products and selected upgraded uses for present products. This will require an investment for product research. He challenged the industry to spend a penny a ton for that purpose, which

Please turn to page 130

PROFITABLE EXPERIENCE *makes major cement producer a Long-Time MANITOWOC user*



In the Wampum area, limestone averages between 18 and 22 ft. in thickness, and is overlaid by shale which is also recovered for use in the mill. Here, one of two 3-yd. Manitowoc shovels loads broken rock into a 12-yd. truck. The Manitowocs feed a 450-tph crushing-and-screening plant.

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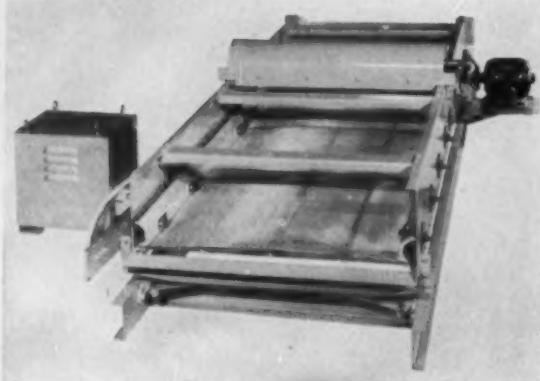
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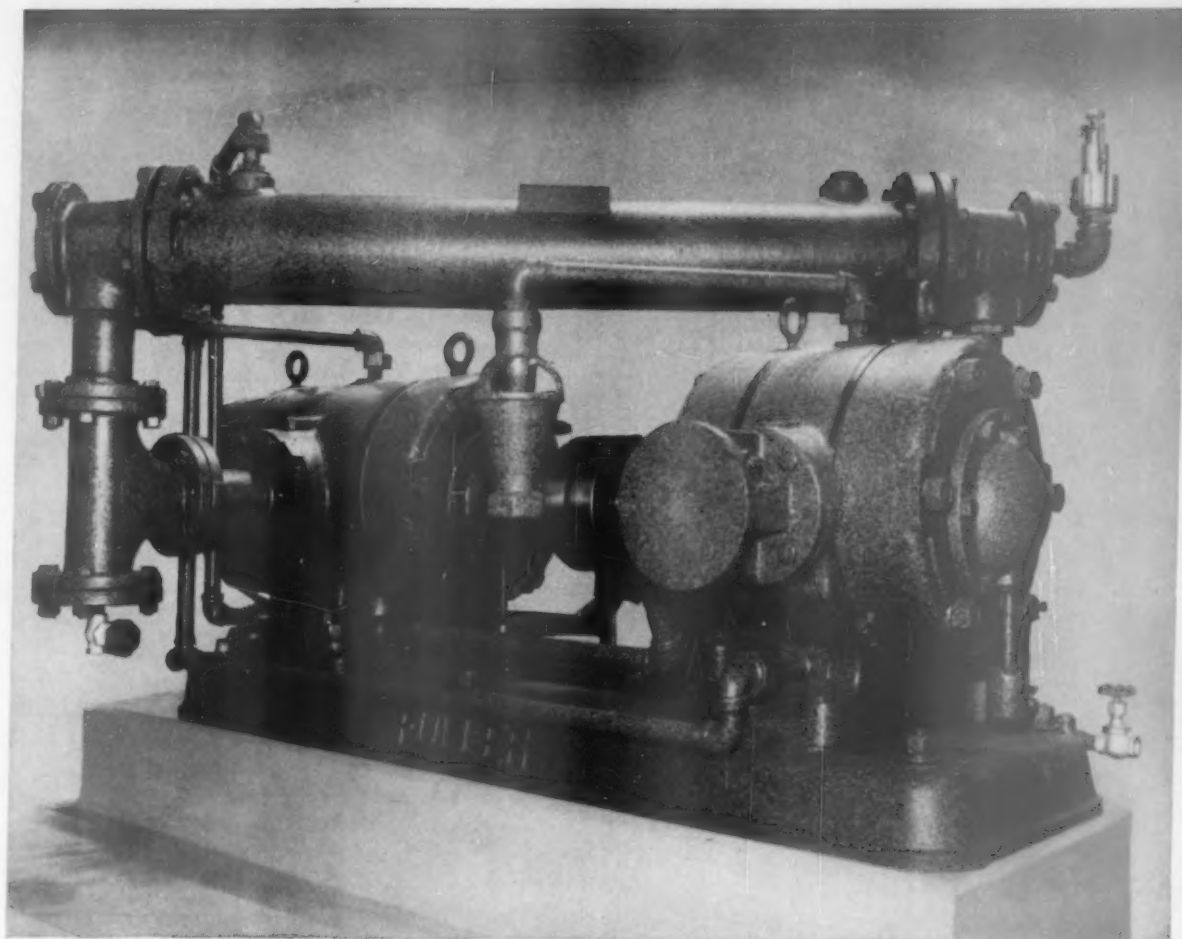
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it fits into a more general classification. Thus, Chapter 10 is on The Effects of Macrostructure Upon the Properties of Materials. (One of the valuable features of the book is Appendix B—a Glossary of Terms as Applied to Materials; where macroscopic is defined as "visible to the unaided eye (or up to 10 x magnification.") Here concrete is mentioned as the most obvious example. Then follows a discussion of particle size and the laws on packing of particles. Again, concrete mixtures are used as illustrations.

Not because it throws any more light on the subject, but as an example of the method of treatment, we quote the following paragraph: "Packing factors may be increased by two methods: (1) By using nonspherical particles and matching surfaces. The packing factor for a pile of bricks, for example, can be nearly 100 percent if they are carefully stacked. (2) By mixing particle sizes. For example, a mixture of sand and gravel will have a greater packing factor than either sand or gravel alone because the sand will fill the pore spaces between the pieces of gravel. Figure 10-8 shows typical variations of the packing factor for mixtures of sand and gravel; this relationship determines the optimum ratio of sand to gravel for a mixture that will fill a given volume with least porosity. If, for example, a ratio of 25 percent sand and 75 percent gravel were used in a concrete mixture, only 10 percent of the volume would be pore space to be filled by cement. On the other hand, a 50-50 mixture would leave 22 percent pore space, and would require 2.2 times as much cement to develop the same strength in the concrete."

There follows a mathematical analysis of the properties of mixtures of sand and gravel to illustrate volume, bulk density, porosity, etc. Concrete is discussed as follows: "As a means of simplification, concrete may be considered as gravel with an admixture of sand to fill the pores. The space still remaining in the sand is then filled with a 'paste' of cement and water. The cement hydrates to form a bond within the concrete. Ideally, it would be desirable to have the hydrated cement fill all the space among the aggregated particles. This is impossible in practice because excess water must be present to supply the required workability to the cement. Assuming that the aggregate is much stronger than the cement, it is the properties of the cement paste which govern the properties of the concrete. Consequently, concrete with a low water-to-cement ratio has greater strength than concretes with higher ratios. With the low ratio, there is more hydrated cement and less excess water in the spaces between the sand and

Please turn to page 128



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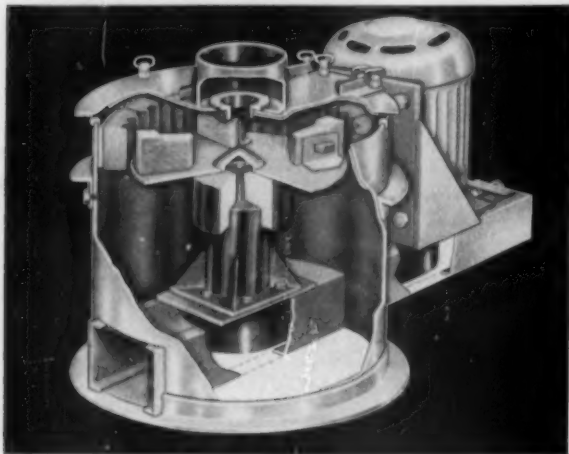
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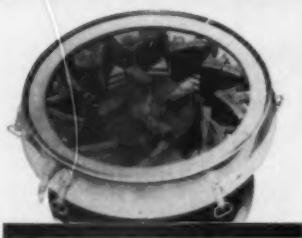


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ROCKY'S NOTES

continued from page 126

gravel particles. This indirect relationship between the strength of concrete and its water-cement ratio is not fully appreciated even by many of the engineers."

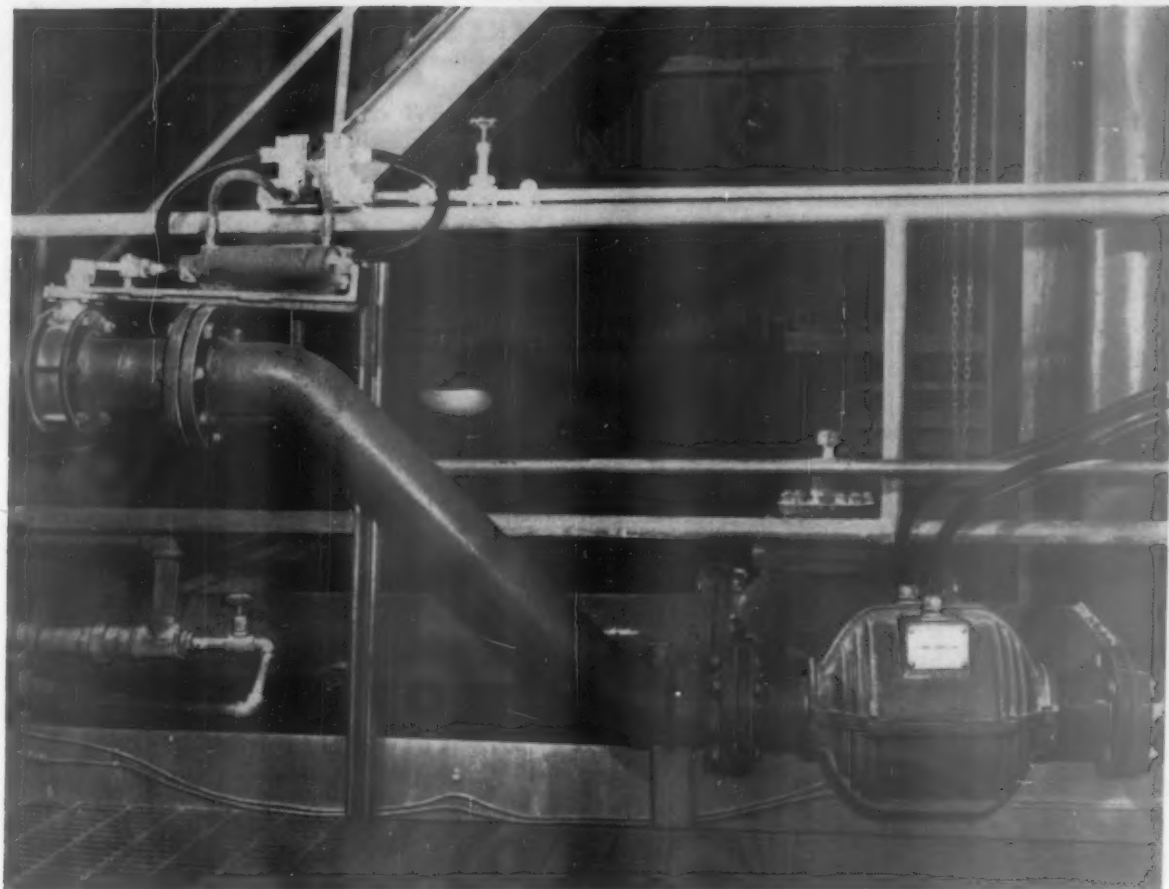
As we said at the start, there certainly is nothing new in this except the way in which the metallurgist author states his case. Most engineers, after 50 years of constant repetition, should know the relationship between water-cement ratio and concrete strength. Probably by them it is considered a direct relationship rather than indirect.

The scope of the book can best be described by a list of some chapter heads: (1) Engineering requirements of materials (covering mechanical, thermal, electrical, chemical properties, cost and measurement of properties). (2) Interatomic attractive forces (covering the structure of the atom, primary forces of attraction—the nature of different kinds of bonds), secondary forces of attraction (Van der Waals' forces, molecular polarization, dispersion effects, hydrogen bridge, interatomic distances, atomic and ionic radii). (3) Arrangement of atoms in materials (molecular materials—number and strength of bonds, bond angles—crystal structures, etc.).

Chapter 4 concerns metallic phases and their problems. The value of this to readers in our industries could be a better understanding of the properties of all materials, with possibly some helpful ideas concerning the materials of which their own processing equipment is manufactured. Chapter 5 deals with ceramic phases and their properties and includes a very instructive discussion of the crystal structures of ceramic phases and the effect of such structure upon properties; that is the structure of silicates. Chapter 6 deals with organic materials; Chapter 7 with multiphase materials, under which are various kinds of steel as well as portland cement. The latter half of the book deals with the stability of various materials under service conditions—the deteriorating effects of heat, frost, irradiation, etc.

By no means the least helpful part of the book are the appendices, which contain a list of selected constants (for physical and chemical calculations); a glossary of terms as applied to materials (particularly helpful to those not familiar with terms used in organic chemistry); hardness conversion scales; table of the elements, with their physical descriptions; properties of selected engineering materials (specific gravity, thermal conductivity, thermal expansion, electrical conductivity, average modulus of elasticity); selected phase diagrams (including those used in the study of portland cement clinker; selected organic structures); selected list of plastics—trade names, etc.;

Please turn to page 130



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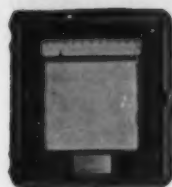
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ROCKY'S NOTES

continued from page 128

selected T-T-T data—temperature-time-transformations; selected hardenability bands of steel; answers to specific problems throughout the book.

Since it is an elementary textbook and most of us need a refresher course in this new science of materials, we feel certain that many of our readers will find this book both interesting and instructive even though the space devoted to concrete is very limited.

END

SLAG INDUSTRY PLAGUED

continued from page 124

should provide \$300,000 a year. "It is doubtful that a penny per ton would have serious effect either on your revenues or your profits," he said, "but it could well supply the means to double both."

Good national highways are a catalyst for economic growth. We can't have the latter without the former, according to Nello L. Teer, Jr., president of American Road Builders' Association. He was the guest speaker at NSA's annual banquet. His main concern was our ability to continue building highways and hold down the cost. It's his opinion that we can, if we get proper cooperation of engineers, contractors, material producers, equipment manufacturers and distributors, those who supply the money, and the public. It will be essential to use new techniques of electronic processing, plus more efficient equipment and management, to hold down cost of highway construction. Some intangible factors to consider are interest and support of national leadership, engineers and the people who pay for the program.

NSA's Director of Research, Fred Hubbard, has resigned that position after 31 years of dedicated contribution to the industry. He is the first to occupy that position, having assumed his responsibilities when the job was instituted by NSA in 1929. In the future, Howard Williams will serve as chairman of the NSA Technical Committee, and Chief Engineer Lewis will take over the duties formerly handled by Mr. Hubbard.

In recognition for his long and faithful service, Mr. Hubbard was presented with NSA's first award, at the annual banquet.

New officers of the association, elected at the meeting, include: Edward C. Levy, Sr., president, and George W. Lanier, vice president. E. W. Bauman was re-elected managing director, and W. S. Shaw was renamed treasurer.

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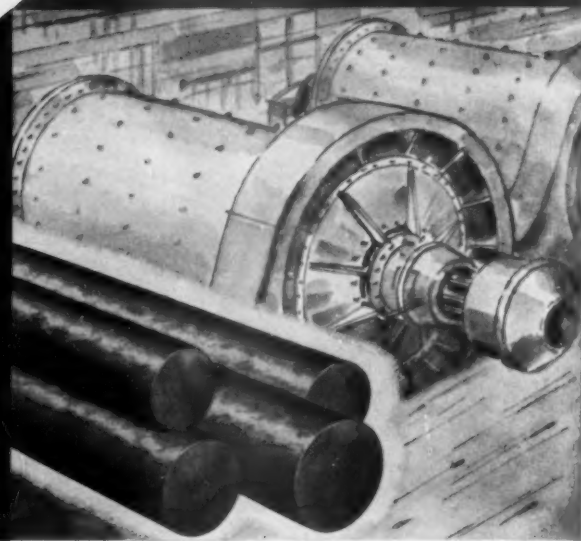
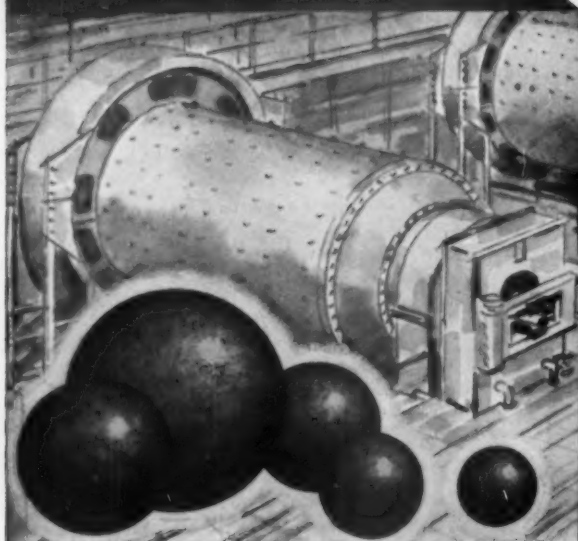
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In the West: THE COLORADO FUEL AND IRON CORPORATION — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Leandro • Seattle • Spokane • Wichita
In the East: WICKWIRE SPENCER STEEL DIVISION — Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
Enter 1459 on Reader Card

7693-B-REV.

READER-SERVICE CARD

RP-1-61

ROCK PRODUCTS

79 W. Monroe St.

JANUARY, 1961

Chicago 3, Illinois

Cannot be serviced after
March 1, 1961 postmark.

Please print or type

Name _____ Position _____

Company (In Full) _____

Company Address _____ City _____ Zone _____ State _____

Send information on items identified by key numbers beside or below items of interest to you.
List your choice in numerical order. Limit 10 per card.

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IF NO KEY NUMBER, USE COMPANY NAME

BUSINESS REPLY MAIL

No Postage Stamp Necessary if Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

- POSTAGE WILL BE PAID BY -

ROCK PRODUCTS

79 WEST MONROE ST.

CHICAGO 3, ILL.

**MONEY-MAKING IDEAS
FOR YOU --- FREE****HOW TO USE THIS SERVICE**

- 1. Advertised Products**
- 2. New Machinery**
- 3. New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.



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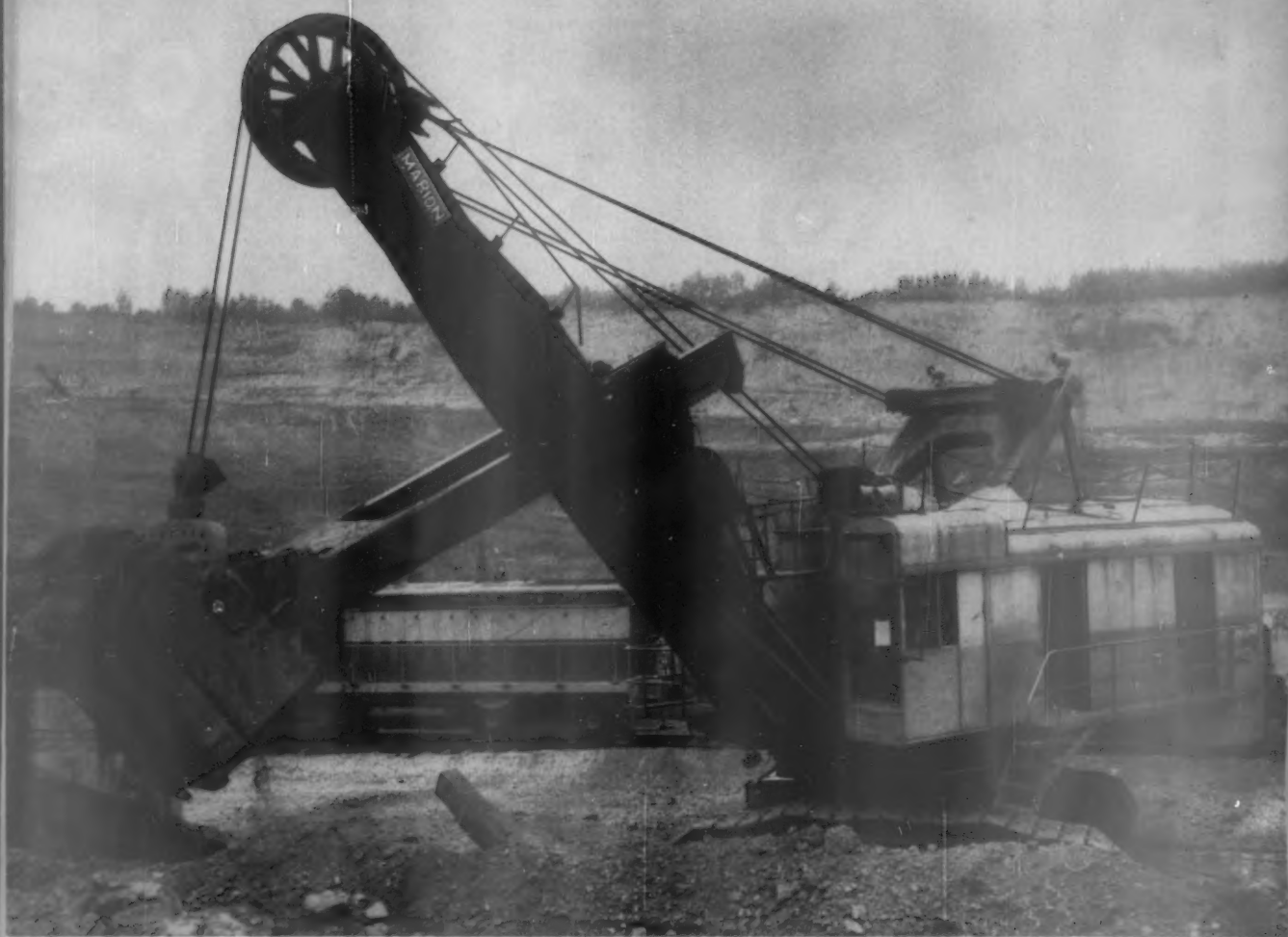
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Unshot Rocky Digging

This Marion 151-M works a 35-40 foot bank of unshot, rocky digging on the Iron Range. Its ability to produce low unit costs under difficult digging conditions has made the 151-M a familiar sight in open pit mines across the nation. Why not let a Marion mining specialist project 151-M unit costs on your property? For years, Marion has been recognized for recommending the right methods and the right machines to produce needed tonnage at the lowest possible costs.

CONSULT



MINING SPECIALISTS

for lowest costs on your property!

MARION POWER SHOVEL COMPANY • Marion, Ohio, U.S.A.

A Division of Universal Marion Corporation



**for
IMPROVED
PERFORMANCE
•
SPRAYING SYSTEMS
SPRAY
NOZZLES**

• Choose from the industry's most complete selection of capacities and types to obtain the nozzles that best fit your job. Improve spraying efficiency and lower your spraying costs. Wide choice of nozzles for washing, dust control operations and concrete curing.

WRITE FOR Catalog 24... forty-eight pages with complete data on nozzle types, capacities and performance.

SPRAYING SYSTEMS CO.
3285 RANDOLPH ST., BELLWOOD, ILL.

Write for Catalog 24

Enter 1472 on Reader Card

Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.



Buy WILFLEY
for Cost-Saving
Performance

**A. H. WILFLEY
and SONS, Inc.**
Denver, Colo., U.S.A.

WILFLEY
centrifugal PUMPS

Enter 1473 on Reader Card

WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

SAFARIS IN CEMENT

continued from page 120

vantageous and stable it is. This is practically impossible without maintaining equilibrium within reasonable tolerance.

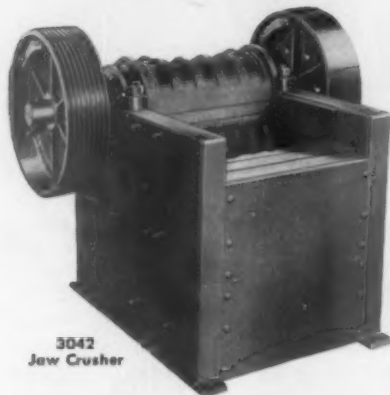
With constant speed and micro feed, close-to-hood burning can be maintained. Also, automatic burner control keeps an ambient temperature uniform completing the circuit. As a matter of fact and common sense, it is easier, safer and more satisfactory to burn close to the hood than further up the kiln. The precession is conserved. One really does not burn cement clinker. It forms itself, exothermically, by starting in a hot ambient. All it needs is an umbrella of heat and constant speed and no interference. It carries on in equilibrium.

Other necessary conditions are: The burner and its control must be set to give proper quantity and temperature of primary air and fuel to keep ambient temperature fixed. Draft must be set to give secondary air from the cooler with the proper temperature, and the quantity adjusted by recuperator control from kiln recuperator throat to its fan. With wide enough amplitude, a burner with automatic primary control, good secondary air and complementary temperature control will have enough capacity to compensate for considerable variation in kiln temperature conditions. This was proved in practice and with the weakest of fuel—natural gas and very variable gas. With coal or oil, conditions should be better. There is a great opportunity for research departing from the work of Paper 384—but on a plant-size setup. **END**



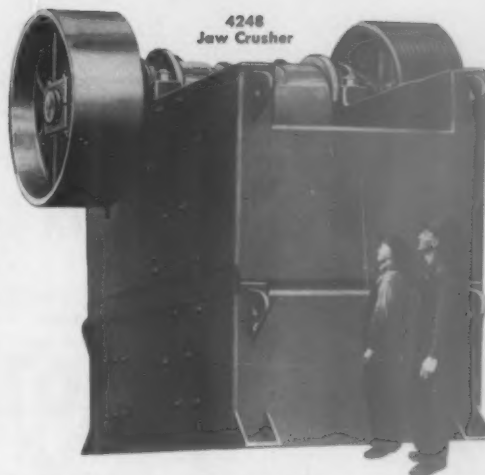
"ARE YUH TRYIN' TO TELL ME YUH ROCK MEN KIN MAKE USE OF BOULDERS?"

JAW CRUSHERS



3042
Jaw Crusher

PIONEER overhead eccentric action offers a double-action crushing stroke. This provides forced feed and greater capacity. Shaft bearings at each end are placed closer together than on any other crusher you can buy, thus greatly reducing shaft strain. Double-walled, welded steel base reduces weight while increasing strength. Jaw plates are reversible for double manganese use. Crusher can be adjusted while in operation. 12 sizes from 1016 to 4248.

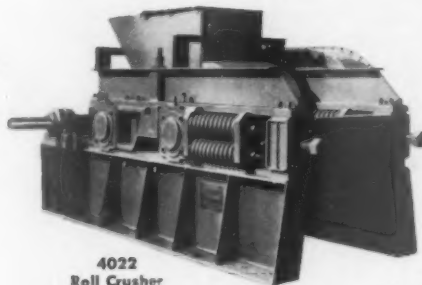


4248
Jaw Crusher

For men who like to underbid their competitors (and make a nice profit, too!)

Pioneer® Crushers

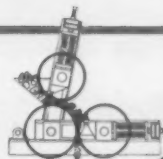
ROLL CRUSHERS



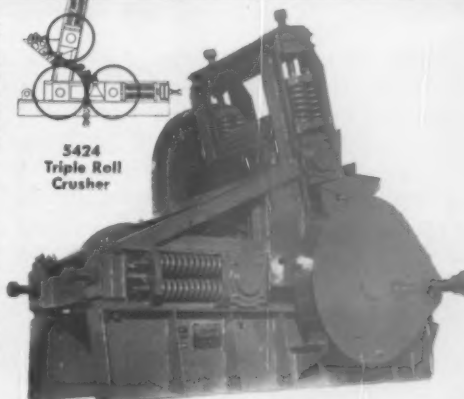
4022
Roll Crusher

TWIN ROLL CRUSHERS. PIONEER design makes 100% of roll shell available as crushing surface with resultant savings in manganese. Shells are easily replaced without removing bearings from shaft. Driven by PIONEER-developed star gears fully enclosed and running in oil. Sizes: 2416, 3018, 3024, 4022, 4030 and 5424.

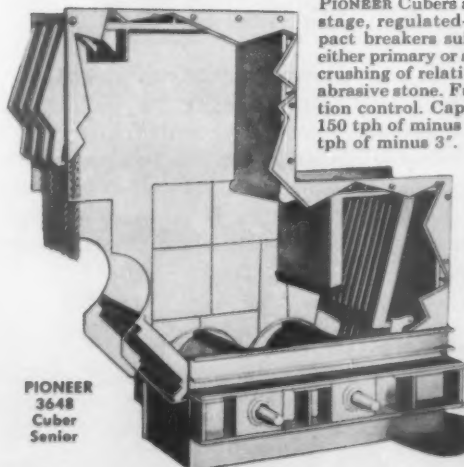
TRIPLE ROLL CRUSHER. Add a third roll and you have a Triple Roll Crusher. This makes it possible to increase stage of reduction to as much as $6\frac{1}{2}$ ". Triple Roll Crushers are manufactured only by PIONEER. They are available in 3018, 4022 and 5424 sizes.



5424
Triple Roll
Crusher



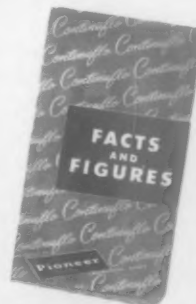
IMPACT BREAKER



PIONEER
3648
Cuber
Senior

PIONEER Cubers are multi-stage, regulated-flow impact breakers suitable for either primary or secondary crushing of relatively non-abrasive stone. Full gradation control. Capacities to 150 tph of minus 1" or 350 tph of minus 3".

For your free copy of **FACTS AND FIGURES** (the most complete and comprehensive handbook for the aggregates-producing industry), write to Pioneer Engineering, Minneapolis 14, Minnesota, or contact your Pioneer Distributor.



Pioneer® ENGINEERING

DIVISION OF POOR & COMPANY, INC.
MINNEAPOLIS 14, MINNESOTA

TRUCK TALK

by CHET CUNNINGHAM



If you don't use some type of chemical oil analysis on your mining trucks and cats and dozers and other rock and aggregate producing engines, you are losing money on oil, oil filters and oil change labor.

Today, with simple in-your-shop analysis, no rock products outfit should be without it. This analysis means you can get almost 100 percent utilization from your motor oil.

For example, a heavy logging outfit in Lewiston, Idaho, had been changing oil on a big stationary diesel engine after 40 hr. of operation. They used an oil analysis and found they could extend their change period up to 400 hr. They had been spending 10 times too much on oil, filters and oil change labor!

This is an extreme example, but it shows that your oil should be used as long as it is serviceable. Don't throw it out at an arbitrary number of miles or hours. There are many oil evaluation methods and makes on the market.

One system uses a simple chemical reaction principle, a special filter paper, two drops of crankcase oil and an indicator solution. A man can be taught to use it in an hour. You simply take two drops of oil from the crankcase and put one drop on each of the two types of filter papers. The oil diffuses, then is ready to read. It shows three things:

- Whether the oil is too dirty to continue using.
- Whether the oil has glycol, water or other contaminants in it, making it ready for a change.

• Whether the oil additives have been used up, turning your oil base back to acid, which means excessive engine wear.

By using some type of an oil analysis and checking each engine each week, you can know almost to the mile when that engine's oil needs replacing for any of the above three reasons. That will mean increased oil utilization and lower truck and engine operating costs on all of your rock products machines.

Are your truck tires wearing out faster than they should? There could be lots of reasons, from new haul roads to jack rabbit starts—but it probably is mechanical. Take a look at the chart (pictured) which comes from Texaco. It illustrates

	SYMP-TOM	CAUSE	CURE
	RAPID WEAR AT SHOULDERS	UNDER INFLATION	INFLATE TO RECOMMENDED MEDIUM
	RAPID WEAR AT CENTER	OVER INFLATION	LET OUT AIR WHILE TIRE IS COLD
	CRACKED TREADS	ALTERNATING UNDER- AND OVER-INFLATION	MAINTAIN REGULAR PRESSURE
	WEAR ON ONE SIDE	TOO MUCH CAMBER	CORRECT CAMBER
	FEATHERED EDGE	TOO MUCH TIE-ROD OR TOE-OUT	REALIGNMENT
	BALD SPOTS	WHEEL UNBALANCED	BALANCE

some of the most common causes of mechanical and pressure-caused tire damage.

Check the symptoms; if they match a tire problem of yours, follow on down the column to the cause, then down to the cure. Why don't you clip out this illustration and tape it up in your shop? Might come in handy for settling arguments about tire wear.

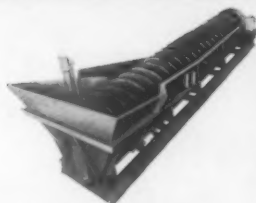
Smoke? Keep that truck window open. Safety Council says that three cigarettes give off enough carbon monoxide gas to bring your vision to the danger point. It doesn't kill you, but the wreck it causes could!

END

WEMCO

COMPLETE EQUIPMENT FOR AGGREGATE TREATMENT

SAND PREPARATION



WEMCO

SAND-PREPARATION MACHINE

Used wherever sand must be produced to specifications. Spiral with 75% pitch provides greater sand raking capacity ... retention of fine sands with sharper separation ... less maintenance.



WEMCO

SAND-CLONE

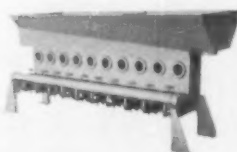
Recovers and sizes sands in the finer fractions from dilute slurries. Supplements Wemco Sand Prep for special conditions or requirements.



WEMCO

SAND-SORT

Free-settling classifying tank for separating sands into desired grades and sizes, removing large volumes of excess water, blending sand to varied specifications, with new automatic controls. Features individually controllable valve discharge ... automatic valve closure in case of power failure or shutdown ...



WEMCO

SAND-SIZER

Accurate sizing of sand into multiple fractions, and blending, for specification sand. Simple operation with maximum flexibility and control of each cell or compartment.



WEMCO

SAND-SCRUBBER

For economical scouring of sands, scrubbing off of coatings, breaking up of conglomerates. Opposed propeller blade action produces maximum scrubbing action with minimum contact time.

AGGREGATE BENEFICIATION

WEMCO

HMS MOBIL-MILL

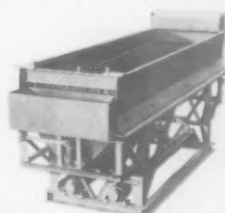
The only proved "packaged" HMS plant, pre-engineered, ready for set-up and operation. Removes wide range of deleterious material, produces large volume specification aggregate at low cost, minimum labor.



WEMCO

REMER JIG

For cleaning large tonnages of sand and gravel, production of specification aggregate ... removes lightweight deleterious materials. Differential acceleration with long, wide bed gives faster, more active segregation over larger area.

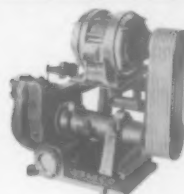


PUMPING—SAND and GRAVEL

WEMCO

SAND PUMP (HORIZONTAL)

Universally in use for transfer of slurries containing sands and abrasive solids, screen products and grinding mill discharge to washers, scrubbers, sizers, or sand preparation machines. Simple operation. Minimum wear and labor requirements.



WEMCO

SAND PUMP (VERTICAL)

Performance of horizontal Sand Pump with added vertical features. Widely used for clean-up duty installed over sump without need for separate pump pit.



WEMCO

TORQUE-FLOW PUMP

Unique Torque-Flow principle, open impeller, allows pumping of anything in a slurry which will enter throat. Handles solids with little wear at steady discharge pressures. Clogging by solids is eliminated.



WEMCO

a division of

Western Machinery Company

650 Fifth Street, San Francisco 7, California

other offices in:

New York Toronto
Hibbing Paris

NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Revised testing sieve specifications bulletin

THE W. S. TYLER CO. has made available a bulletin covering 1960 revised specifications for testing sieves. The bulletin also lists specifications being proposed as International Standards. The new specifications combine the former coarse and fine series into a single series. Wire diameters are specified to produce a progressive relationship between sieve openings and wire diameters throughout the entire series.

Enter 700 on Reader Card

Sand pump bulletin

WEMCO, div. of Western Machinery Co., has made available a bulletin describing the use of the company's sand pumps for handling sand slurry, abrasive pulps, heavy density media and slimes. Included is a disassembly and maintenance photo sequence and performance table for the various size pumps.

Enter 701 on Reader Card

Truck cost record books

INTERNATIONAL HARVESTER CO. is offering truck cost record books and forms for daily driver reports to as-

sist truck users in evaluating the performance of their equipment. The truck cost record book consists of 20 pages, and each book allows an accurate record to be kept of all fixed, operating and maintenance charges against one truck for one full year. The driver daily report may be used in conjunction with the truck cost record book. It provides space for reporting information such as number of trips, trip time, number of stops, mileage, loads, and fuel, oil consumption.

Enter 702 on Reader Card

"Opportunities Unlimited"

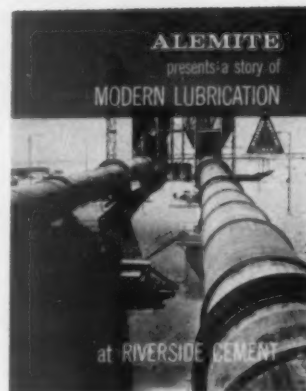
SOCIETY OF MINING ENGINEERS OF AIME has published a booklet for students who have the aptitude and ambition to pursue careers in mineral engineering. The Society is a constituent organization of the American Institute of Mining, Metallurgical, and Petroleum Engineers. The booklet declares that opportunities in the field of mining are unlimited. It also outlines the various phases of the mining industry.

Enter 703 on Reader Card

Cone crusher handbook

NORDBERG MFG. CO. has released a 21-page handbook entitled "How to get the most from your Symons Cone Crusher." Prepared to aid users of cone crushers in securing the best possible performance and maximum efficiency from their crusher, the handbook discusses some of the common problems and faults encountered in crusher operation. Bad crushing practices and good crushing practices are outlined with the help of installation photographs. Among the subjects presented are: ratio of reduction, feed, selection of crushing members, crusher speed, countershaft adjustment, lubrication, cold weather operation, crushing hot materials and periods of inspection.

Enter 704 on Reader Card



Modern lubrication

ALEMITE, Div. Stewart-Warner Corp., has released a catalog on modern lubrication at Riverside Cement Co. The catalog is divided into these illustrated sections: quarry, primary crushing, secondary crushing, conveying, stacking and reclaiming, kiln operation, kiln cooler, finish grinding and bagging bulk loading. In each section it is described how Alemite advised lubrication applications for Riverside.

Enter 705 on Reader Card

Refractories catalog

HARBISON-WALKER Refractories Co. has released a catalog that covers such questions as: What are refractories? What raw materials are used to make refractories? How does refractories research contribute to technological progress? How are refractories produced? How do refractories serve industry? These and other questions are answered in the brochure entitled "Refractories: Nucleus of Industry."

Other sections of the illustrated brochure discuss such technical topics as: sources of raw materials, control testing begins with minerals still in the ground, mining of refractories and quality control from the blasting to batching.

Enter 706 on Reader Card

END

EXTRA



UNIVERSAL SCREENMASTER FLOATS ON AIR AND RUBBER, PROVIDING SHARP, CONTROLLED-SCREENING ACTION FOR EXTRA PRODUCTION

Nothing is quicker or snappier than the air springs of a Universal Horizontal Screenmaster.

Metal fatigue in conventional leaf and coil springs causes sluggish, inefficient screening.

Universal air springs retain their smooth aggressiveness indefinitely, assuring efficient screening action.

The *extra production* capacity of the Screenmaster and its ability to provide *peak performance* continuously through years of rigorous use have been demonstrated again and again. Owners have called it the most significant modern development in screening efficiency.

Exclusive, rubber-bushed phasing bars in the Screenmaster

cradle the basket and maintain positive control of its action. All parts work smoothly together without the destructive corner to corner violence of conventional screens using old fashioned sluggish leaf and coil springs.

At the same time, the compressed air in Universal's air springs rebounds the screen with a snap that cuts even damp or wet material. Air springs also absorb shock and vibration.

This unique combination of phasing bars and air springs assures a consistent high level of performance, resulting in *extra production* in all types of material.

For further details, contact your Universal Distributor. He will help you select the best size for your needs in either stationary or portable plants.



UNIVERSAL ENGINEERING CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa

A Subsidiary of Pettibone-Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

44th Annual Convention

NATIONAL CRUSHED STONE ASSOCIATION

SCHEDULE OF EVENTS

Tuesday January 17

MORNING—GENERAL SESSION

NOON—GREETING LUNCHEON

AFTERNOON—OPEN FOR INDIVIDUAL PLANS

EVENING—COCKTAIL HOUR WITH BALANCE OF EVENING
OPEN FOR INDIVIDUAL PLANS

Wednesday . . January 18

MORNING—CONCURRENT SESSIONS

- SESSION FOR OPERATING MEN AND
EQUIPMENT MANUFACTURERS
- SESSION FOR SALESMEN

NOON—GENERAL LUNCHEON

AFTERNOON—SESSION FOR EXECUTIVES AND FINANCE OFFICERS

EVENING—OPEN FOR INDIVIDUAL PLANS

Thursday . . . January 19

MORNING—CONCURRENT SESSIONS

- ROUND TABLE DISCUSSIONS FOR OPERATING MEN
AND EQUIPMENT MANUFACTURERS
- SESSION ON FEDERAL LABOR STANDARDS

NOON—MANUFACTURERS DIVISION LUNCHEON

AFTERNOON—OPEN FOR INDIVIDUAL PLANS

EVENING—"A NIGHT IN THE TROPICS"

(DINNER—DANCING—ENTERTAINMENT)

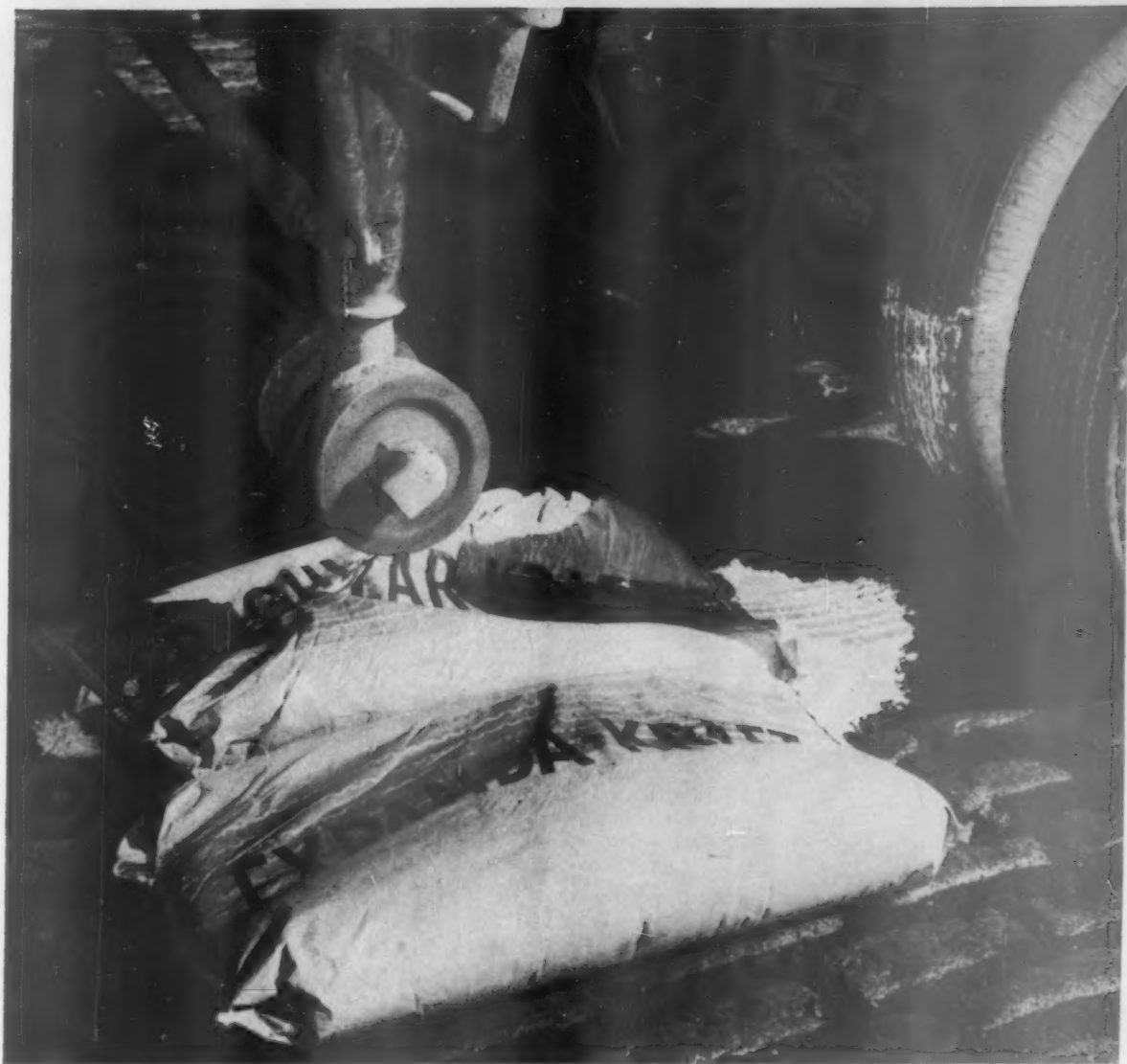
Friday January 20

MORNING—GENERAL SESSION

NOON—ADJOURNMENT

AMERICANA HOTEL, BAL HARBOUR, MIAMI BEACH, FLORIDA

JANUARY 17-18-19-20, 1961



One bag broke . . . the other has two-way stretch

The one with stretch is made of H&W's new, high-strength Expanda Kraft.

A large tractor-trailer ran over both bags of equal weight and plies. The regular kraft bag burst under pressure—see the tell-tale flour on the inside tire tread. But look at Expanda Kraft—*not a sign of breakage!*

Expanda Kraft is stronger, because it's made

by a special roll-crepe process. It's resilient, has two-way stretch, and soaks up shock. And Expanda Kraft is available in white, semi-bleached and natural.

Expanda Kraft comes in 40, 50, 60, 70, 80 and 100-pound basis weights. *For samples and information*, write Hollingsworth & Whitney, Division of Scott Paper Company, Chester, Pa.

Safeguard your product in EXPANDA KRAFT®

HOLLINGSWORTH & WHITNEY DIVISION OF



SCOTT PAPER COMPANY

NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Lightweight dump trailer body

A new dump body was designed particularly to provide the greatest structural strength per pound of weight. At the same time, the Model XL trailer body conforms to accepted design principles.

The body is hinged to the truck chassis with a 6 x 70-in. stub longitudinal. A completely boxed top roll section acts as a strong compression member to prevent side spreading at any stage in the dumping cycle. Side and bottom plates are strengthened with 1-in. V-corrugations.

Bodies of the new design are available in standard lengths from 16 to 28 ft. in a capacity range between 10 and 35 cu. yd. They can be used with any combination of axles to meet existing state weight laws. (Galion Allsteel Body Company, Galion, Ohio)

Enter 300 on Reader Card

Car shaker

Heavy, solidly packed or frozen materials can be removed from open top railroad cars with a newly designed car shaker. This unit gains its effectiveness from the combination of vibration and impact.

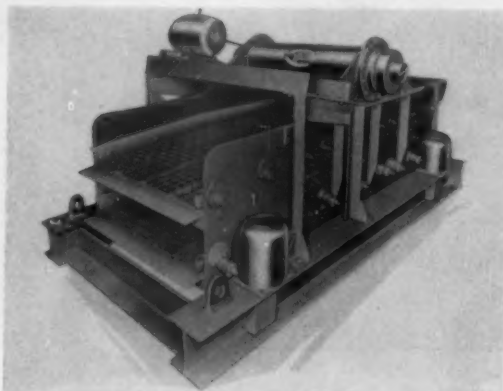
The 4,200-lb. shaker is suspended from the side of the car—in the middle or at any point where material hangs up. For especially difficult materials, two units can be used effectively, one on each side or both on the same side.

Vibration and impact are achieved by the action

of an unbalanced shaft driven by a 10-hp. motor. The eccentric action of the rotating shaft is carried directly to the side of the car without going through any welded connections. The frame of the shaker itself is of all-welded construction. Since the whole unit is suspended from the side of the car, no clamping devices are required. Only auxiliary equipment needed is a 2-ton hoist on a trolley and electrical connections. (Eastern Constructors Inc., Poland, Ohio)

Enter 301 on Reader Card

Vibrating screen suspension system



An improved spring and rubber mount suspension system for vibrating screens provides greater stability and ease of suspension. A heavy welded H-beam base gives a smaller ratio of dead to vibrating weight. This base supports four rubber and enclosed-spring mounts that completely eliminate vibration in the supporting structure, according to the maker.

The new suspension system is easily adapted to cable suspension for it eliminates the need for additional suspension springs. Adjustments to the new system are simple and easily made. Only a nut and lock nut need to be tightened or loosened. Spring replacement is said to be as easy as adjustment. (Deister Machine Co., 1933 E. Wayne St., Ft. Wayne 4, Ind.)

Enter 302 on Reader Card

Please turn to page 146



At Longhorn Portland Cement Co. plant, San Antonio, Texas, this 22-ton Plymouth locomotive hauls limestone rock from quarry to plant 55-hours a week, all year 'round.

"Plymouth Diesel makes over 17,000 round-trips per year — keeps production rolling smoothly"

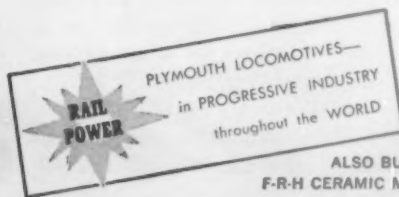
"Hauling 4800 tons of limestone rock per day from quarry to mill calls for plenty of speed, power and stamina on the part of the industrial locomotive doing the job," says Mr. Gaines Voigt, superintendent of the Longhorn Portland Cement Company plant, San Antonio, Texas.

"A 22-ton Plymouth Diesel equipped with Torqomotive Drive performs this task for us efficiently and economically—makes a round-trip of more than one-mile every 8½ minutes to keep production rolling smoothly. Our Plymouth pulls 6 cars at a time—72 tons per load—

completes over 17,000 round-trips per year under rugged operating conditions."

Find out today how Plymouth's high operating efficiency and low operating cost can make your hauling, switching and spotting jobs more profitable. For complete information on a Plymouth built specifically to meet your haulage needs, simply send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-5, Plymouth, Ohio. Purchase plans are available on gasoline and Diesel models.

**PLYMOUTH®
LOCOMOTIVES**
WITH TORQOMOTIVE DRIVE



ALSO BUILDERS OF
F-R-H CERAMIC MACHINERY

NEW MACHINERY

continued from page 144



Huge new shovel

Latest addition to this manufacturer's line of heavy-duty shovels has dipper capacities between 8 and 18 cu. yd. on booms up to 100 ft. This giant is designated the Model 270-B and has a number of unusual control and construction features.

A new variable-voltage static control uses magnetic amplifiers and has no moving parts. This is said to permit trouble-free, instant-response operation as well as complete control of the drive speed.

Construction details include a one-piece boom of new design. It has a wide boom foot, free of crowd machinery. In addition, a newly designed crawler mounting and revolving frame supports an elevated operator's compartment to give wide angle vision. (Bucyrus-Erie Co., South Milwaukee, Wis.)

Enter 303 on Reader Card

Bin measuring device

The amount of granular dry solids in bins can be measured with a new device named "Measure-fill." This mechanical sensing instrument will find wide application in the rock products industry to determine the level of materials in cement, lime and gypsum tanks as well as the amount of aggregates in sand, gravel or crushed stone storage compartments. The rugged, simple system is said to be impervious to heat, dust or vibration.

In operation, a reversible motor lowers a weight into a closed bin. When the weight strikes the top of the material in the bin, the sudden change in tension in the weighted cable reverses the motor. When the weight touches a stop near the top of the bin, the cycle is repeated—as often as four times a minute when material is near the top.

A potentiometer on the drum sends a signal to a "memory-cell," a meter dial or a recording instrument calibrated to the capacity of the bin.

The information gathered in this way can be directed to a central control panel. There the operator can observe the change in level of a number of storage bins and can take the appropriate action. (PolyTech Research, Inc., Orlando, Fla.)

Enter 304 on Reader Card

Variable-speed drive

A new variable-speed drive is offered in low horsepower sizes. The $\frac{1}{2}$, $\frac{3}{4}$ or 1-hp. units give a 10 to 1 range of output speeds.

A simple control wheel regulates the output shaft to the desired speed, while a pointer indicates the exact rpm. Torque is increased at low speeds with an integral 4-speed transmission.

Either drip-proof or totally enclosed fan-cooled motors can be supplied for the lightweight, compact drive. (The Lima Electric Motor Co., Inc., Lima, Ohio)

Enter 305 on Reader Card

Bulldozer



First in a new line of "Paydozers" is a 55,000-lb., 300-hp. unit. It is equipped with a blade about 12 ft. wide at the cutting edge that can tilt forward, backward and 10 deg. to either side.

Unique feature of the new D-120 dozer is the fact that it can be converted to a front-end loader. This is accomplished with an optional package that can be assembled in less than two working days.

The basic machine is equipped with full-power shift transmission to give four speed ranges up to 26 mph., either forward or reverse. It is complete with hydraulic steering and hydraulic controls. (The Frank C. Hough Co., 705 Seventh Ave., Libertyville, Ill.)

Enter 306 on Reader Card

Please turn to page 148

REDUCE BULK MATERIALS HANDLING COST

SYNTRON

VIBRATORY

FEEDERS



HEAVY DUTY MODELS—HIGH CAPACITY, CONTROLLED FEEDING

Syntron Heavy-Duty Vibratory Feeders have rated outputs of from 25 to 1000 tons per hour. They are designed to handle a great diversity of materials in a wide range of particle sizes—fine powder to large lumps, damp or dry, hot or cold.

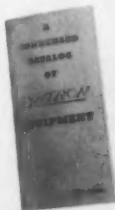
Syntron Vibratory Feeders are plant proven for efficient, accurate, high capacity feeding, spreading, cooling, heating, and drying of bulk materials.

The Syntron electromagnetic drive has few mechanical moving parts, insuring dependability and low maintenance. Magnet and springs are dust tight for longer trouble-free service. Instant control of amplitude permits quick, accurate adjustment of material flow.

Available for floor or suspension mounting with flat pan or tubular trough in sizes to meet every feeding requirement.



Feeding minus 5 inch stone from the primary crusher onto a belt conveyor.



Write for Syntrons' Catalog #605 and the name of the Representative nearest you.

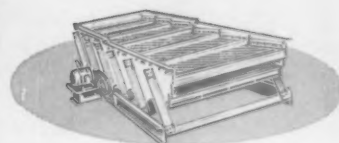
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SYNTRON

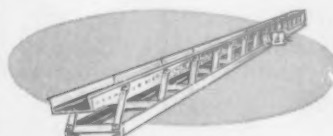
SYNTRON COMPANY

450 Lexington Avenue • Homer City, Pa.

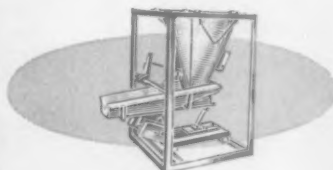
Other
SYNTRON
equipment
of proven
dependable
quality



Mechanical Vibrating Conveyors Screens



Mechanical Vibrating Conveyors



Dry Feeder Machine



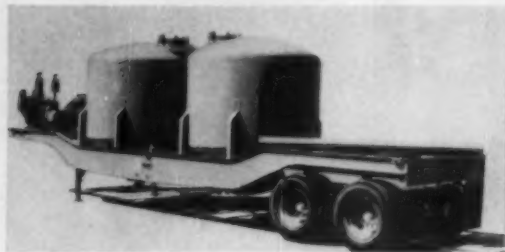
Rectifier Power Units



Gasoline Hammer Rock Drills

NEW MACHINERY

continued from page 146



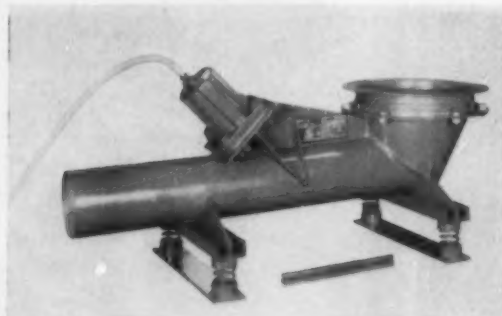
Bulk materials trailer

The fine granular materials of the rock products industry can now be handled in a pneumatically operated bulk material hauler. The "Jet-25" trailer can be unloaded twice as fast as conventional units, according to the maker. Up to 4,000 lb. per min. can be discharged through a 4-in. pipe.

Material is carried in two smooth-walled tanks that can be quickly and easily cleaned to prevent material contamination. High-pressure, low-volume air makes any powdered or granular material flow smoothly out of the tanks. These can include portland cement, lime, silica or plaster. (The Heil Co., Milwaukee 1, Wis.)

Enter 307 on Reader Card

Pneumatic feeder



Powdered or granular materials can be fed or conveyed out of bins or hoppers with a new, pneumatically operated tubular unit. It is supported by four coil springs to isolate vibration; at the same time, headroom requirements are kept to a minimum. These springs never need tuning and eliminate heavy bases, counterweights and cushion blocks.

Capacity is controlled by the pressure of air at the vibrator, ranging from 10 to 100 psig. Flow is started or stopped by a quick-acting valve. (The Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio)

Enter 308 on Reader Card

Sheet metal welder

The Micro-Wire welding process is now offered in a compact, portable package. This has been made possible with the development of a new compact, constant-voltage motor generator welder.

The portable package consists of the 25-v., 200-amp. welder with voltmeter and ammeter, wire feed unit, micro-gun and cable assembly. In addition, a gas regulator, flowmeter, hose and argon adapter are mounted on a portable truck that includes space for two cylinders of gas.

In operation, a small-diameter bare wire is automatically fed into a welding zone shielded by carbon dioxide or an argon-carbon dioxide mixture. The process produces a high-quality weld on gauge steels and on sheet metal applications where poor fits are encountered. (Hobart Bros. Company, Troy, Ohio)

Enter 309 on Reader Card

Air scrubber

An air-scrubbing system with no moving parts promises an economical solution to many rock products producers' dust-collecting problems. The new unit uses a water spray over a self-cleaning stainless steel screen.

Tests have demonstrated high-efficiency dust collection for the relatively low-cost unit. An efficiency of about 99.3 percent was attained on a talc with size of 99 percent less than 10 microns. Pressure drop across the scrubber in this test was less than 2.3 in. of water, while actual water consumption was about 1 gpm. per thousand scfm.

All units have the same basic design, and self-contained units are offered in capacities up to 50,000 cfm. of air. (Antipol Corp., 407 Hill Arcade Bldg., Galesburg, Ill.)

Enter 310 on Reader Card

Diesel fuel additive

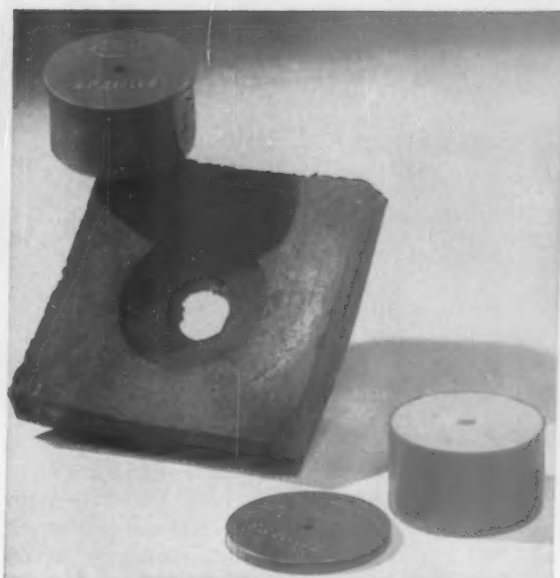
A new fuel supplement for diesel oil is said to improve the operating efficiency and performance of diesel engines. "L-X" apparently carries away internal deposits, insures a proper spray pattern in the combustion chambers and prevents pre-ignition. In addition, it prevents piston ring sticking, fuel waste and the formation of corrosive acids. The additive has been proven by field tests that covered thousands of miles of heavy-duty service. (Lubrication Engineers, Inc., P.O. Box 7128, Fort Worth, Texas)

Enter 311 on Reader Card

Please turn to page 150



Extra easy to load, you simply thread the new SPENITE Explosive Boosters on detonating cord. Knot holds Spenite boosters in place when cord is lowered in hole.



The hole blasted in this inch-thick steel plate is dramatic proof of the energy developed by the new SPENITE booster. Read about it below:

New Spencer Development Slashes Cost Of Boostering Ammonium Nitrate-Fuel Oil Blasts

Advanced high-efficiency booster called SPENITE* is first material specifically designed for use with this low-cost explosive

Pioneers in money-saving ammonium nitrate-fuel oil explosives, Spencer Chemical Company now introduces SPENITE—a revolutionary new boosting material that cuts blasting costs even further!

Spencer SPENITE Boostering material is specially formulated to detonate ammonium nitrate-fuel oil mixtures. By developing the best blast characteristics of this economical explosive, SPENITE offers two important advantages:

1. SPENITE cuts explosive costs by lowering the cost of detonating materials and reducing the number of boosters required per hole.
2. SPENITE provides maximum blast efficiency by generating more intensive explosive heat.

This remarkable discovery is based on test results which indicate that for efficient boosting of ammonium nitrate-fuel oil mixtures, the heat which the booster generates is more important than the velocity of the detonation. Explosive heat generated by the SPENITE booster is at least 50 per cent greater than with other commercial boosters.

Package is specially-designed, round plastic containers, SPENITE boosters can easily be threaded on 50-grain detonating cord at desired intervals. The hole can then

be filled with Spencer N-IV Ammonium Nitrate-fuel oil mixture, stemmed, and shot in the conventional manner.

Free technical assistance is available from Spencer to acquaint you with the cost-cutting advantages of new SPENITE boosting material and Spencer N-IV Ammonium Nitrate as well. Mailing this coupon now can guide you to big saving on blasting materials.

*SPENITE is a trademark of Spencer Chemical Company.



Spencer Chemical Company, Dept. IAN
405 Dwight Bldg.
Kansas City 5, Missouri

Rush me FREE information: ☐ SPENITE boosting material
☐ Spencer N-IV Ammonium Nitrate.

NAME.....

FIRM.....

ADDRESS.....

CITY.....STATE.....

NEW MACHINERY

continued from page 148



High-capacity truck loader

A new truck-loading system combines exceptional capacity with great mobility. Its 60-in. high-speed belt conveyor is capable of pouring as much as 3,500 tph. of aggregates into haulage rigs. At the same time, the whole 32-ton assembly can be dismantled by a two-man crew and be hauled away as a permit load.

The new loader has many novel features. A continuously running belt eliminates excessive, intermittent overtension in the belt and overheating of the 75-hp. motorized head pulley. Dribbling or spill between truck loads is eliminated by a quick-acting, hydraulically operated discharge gate, while the capacity of the system is governed by a hydraulic control on the surge bin gate. The whole operation is controlled from a single push-button control.

First application of the new truck loader was to handle a mixture of blast furnace slag and low-grade iron ore. This heavy, abrasive mixture was used as fill and as subbase material for a western iron mine's new haulage roads. (Western Conveyor Co., P.O. Box 357, Boise, Idaho)

Enter 312 on Reader Card

New wire rope

Said to be the first all-new, all-purpose wire rope design in 60 years, the "7-Flex" rope will be marketed to the rock products industry and others needing rope for heavy service. This new 7-strand wire rope combines the best features of both 6-strand and 8-strand rope. In addition, it has an independent wire rope core.

The new rope has given exceptional service in field tests. With extra flexibility and greater compactness of the seven strands, it has 16 percent more wearing surface than a 6-strand rope. Sizes now available are standard dimensions between $\frac{1}{2}$ and $1\frac{1}{8}$ in. diam. Others will be added to the line as demand develops. (MacWhyte Wire Rope Co., Kenosha, Wis.)

Enter 313 on Reader Card

Specific gravity meter for slurries

A continuous process system for measuring the specific gravity of liquids and slurries has been developed. It does not use nuclear or electronic methods—its accurate, stepless output signal is developed by pneumatic mechanisms.

In operation, a specially designed stainless steel tank continuously weighs a constant volume of process liquid. Since the weight of this volume is directly proportional to the specific gravity of the material, readout is made in specific gravity units. For most applications in the rock products industry where there is no entrained air, this tank can be a simple, open-top vessel.

For heavy slurries that settle quickly, baffles or mixer can be added to the system to maintain the suspension. With few moving parts, the new device is said to have a long, accurate life with negligible maintenance. (Weighing & Controls, Inc., Industrial Park, Hatboro, Pa.)

Enter 314 on Reader Card

Ammonium nitrate booster



Spenite is a booster for ammonium nitrate blasting, said to be the first one to be specially developed for this purpose. The high effectiveness of the new material is attributed to the exceptional explosive heat it generates. As a result, a minimum amount of booster can be used, and the small 10-oz. packages can be spaced in the blasting hole to achieve best results.

First of a projected series of boosters, Spenite A is offered in a round plastic container about 3 in. in diam. and $1\frac{3}{4}$ in. deep. A hole in the center admits a 50-gr. blasting cord. Additional types will be added to the line to solve specific problems encountered with ammonium-nitrate fuel-oil blasting. (Spencer Chemical Co., Kansas City 5, Mo.)

Enter 315 on Reader Card

Please turn to page 152

"My Boss Read the Specs with Tears in His Eyes"



He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier —" (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.



Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3' to 18'.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

STURTEVANT MILL CO.

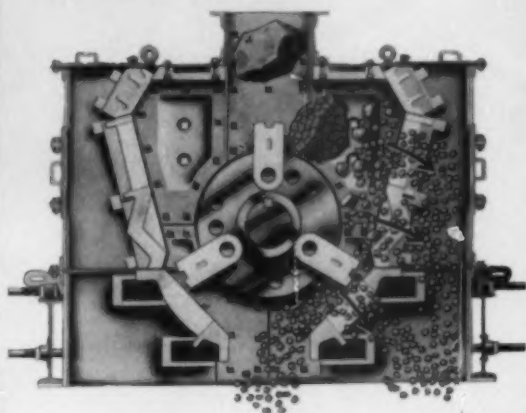
Dry Processing Equipment

The "OPEN-DOOR" to lower operating costs over more years

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

Bulldog Reversible Impactor Hammermills

**LARGER BREAKING CHAMBER
RELIEVES CONGESTION**



**SIZED MATERIAL IS REMOVED
THROUGH GRATES**

Increases production as much as 50%

Grates on both sides of the breaking chamber let sized material through. The sized product is not dragged through the Impactor by the hammers . . . recirculating loads are reduced. This exclusive Bulldog Hammermill feature, plus larger breaking chamber, gives you greater production with less power . . . less hammer wear . . . lower reduction costs.

The fully adjustable center feed Bulldog also features push-button reversal. Provides a new set of hammer faces. Gives you the same quality product in either direction.

Size for size, the Bulldog Hammermill will produce more tons per horsepower with less maintenance cost than any Impactor on the market.

FOR THE NAME OF THE HAMMERMILL REPRESENTATIVE NEAREST YOU, WRITE:

HAMMERMILLS, INC.

Subsidiary of **PETTIBONE** Mulliken Corp.

625 C Avenue NW, Cedar Rapids, Iowa

Enter 1446 on Reader Card

NEW MACHINERY

continued from page 150

Heavy-duty belt carcass

Oriented nylon is the name of a specially processed nylon that gives exceptional properties to heavy-duty conveyor belts. The use of the new form of nylon vastly improves the tensile and impact strength of belts, and greatly reduces their tendency to elongate under loading close to the tensile capacity of the belt. At the same time, this new carcass material does not "wick" or lose its bond to the cover of the belt. Under the extremely heavy-duty conditions in the rock products industry, belts made with the new nylon can be expected to outlast other belts doing the same job by 50 to 100 percent and to require much less maintenance. (Goodall Rubber Co., Trenton, N. J.)

Enter 316 on Reader Card

Vibrating bin

Clean, continuous discharge is promised from the new Live-Bin. It is offered particularly for handling difficult materials—cement, lime, damp sand and many others common to the rock products industry.

The bin is suspended from resilient supports. A sealed vibration unit is mounted externally at the bottom of the bin to keep the material flowing out of the bottom of the bin. This technique may be applied to bins or hoppers of practically any size, with the vibration unit selected and placed to suit the handling characteristics of each material. (Vibra Screw Feeders Inc., 156 Huron Ave., Clifton, New Jersey)

Enter 317 on Reader Card

No-speed switch

A Motion Safety Switch has been designed to be driven by any feeder, conveyor or other machine whose continuous operation is essential to a process. Thus, it is possible to cut the power to screens, crushers or feeders when a conveyor later in the system stops for any reason.

The easily installed, compact device is said to be almost foolproof and to require little attention once it is installed. It takes very little space—about 10 in. high and 10 in. in diam. Driven in either direction with a small chain drive from the shaft to be controlled, it works at either 40 or 100 rpm. The output signal can be fed to a normally open or normally closed circuit to operate lights, horns, controls or motor circuits. (Fuller Co., 100 Bridge St., Catasauqua, Pa.)

Enter 318 on Reader Card

END

How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs. . . without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a *low density* resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling . . . more trips to the warehouse . . . higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a *pasted* bottom and side gussets, a *rectangular-shaped* base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for

a total payload of 2,000 lbs.—the same as the high density resins.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to 1,000,000 lbs. a month. And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.



Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out.

See your local Union-Camp man for complete details.



2,000 pallet load of new, low density resin bags fits easily through existing doors.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.

UNION-CAMP®
MULTI WALL BAGS

Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

* NAME ON REQUEST

MANUFACTURERS NEWS

A-C equipment display

MORE THAN 3,000 Allis-Chalmers equipment sales and dealer personnel from the U. S. and Canada have passed through the "Gateway to the Future" to see the company's introduction of its 1961 line of farm equipment at French Lick, Ind. The largest single display of equipment ever assembled by the company included more than 200 pieces of equipment. The company said that more new products and more basic improvements in existing products were introduced at the display than at any one time before in its history.

Lamm elected to two head positions



THE BOARD OF DIRECTORS of The Pittsburg & Midway Coal Mining Co., a subsidiary of Spencer Chemical Co., Kansas City, Mo., announced the election of a new president. Arnold E. Lamm (photo) has been named to fill the vacancy created by the resignation of Edwin R. Phelps. Mr. Lamm has also been elected vice president of the Spencer Chemical Co. Mr. Lamm is a native of Freeport, Ill. He graduated from the University of Wisconsin in 1930. The Board said that the company is fortunate to secure the executive leadership of a man who has such a thorough knowledge of the engineering, operating, and marketing aspects of the industry.



Construction equipment exposition and road show

THE CONSTRUCTION INDUSTRY Manufacturers Association (CIMA) signed a contract in Mayor Daley's Chicago office (photo) for 537,000 sq. ft. of exhibit space in the International Amphitheatre at Chicago, Ill. This completed preliminary arrangements for the Construction Equipment Exposition and Road Show. This is the largest indoor industrial exhibit in the world. It will be produced and managed by the CIMA, and for the first time it brings together all of the various groups associated with the construction industry as co-sponsors of a construction equipment exposition.

The co-sponsoring organizations are: The American Road Builders' Association, The Associated General Contractors of America, The International Road Federation and the Associated Equipment Distributors.

This exhibit of construction machinery and equipment, previously known as the ARBA Road Show, was last held in Chicago in February, 1957. It is anticipated that with the name change removing any previous limiting influence, the 1963 show—with its broad co-sponsorship by the various in-

dustry groups—will greatly surpass even the magnitude of the 1957 show. The opening ceremonies of the exposition are scheduled for Saturday, February 23, and numerous industry activities will be scheduled prior to and during the exposition.

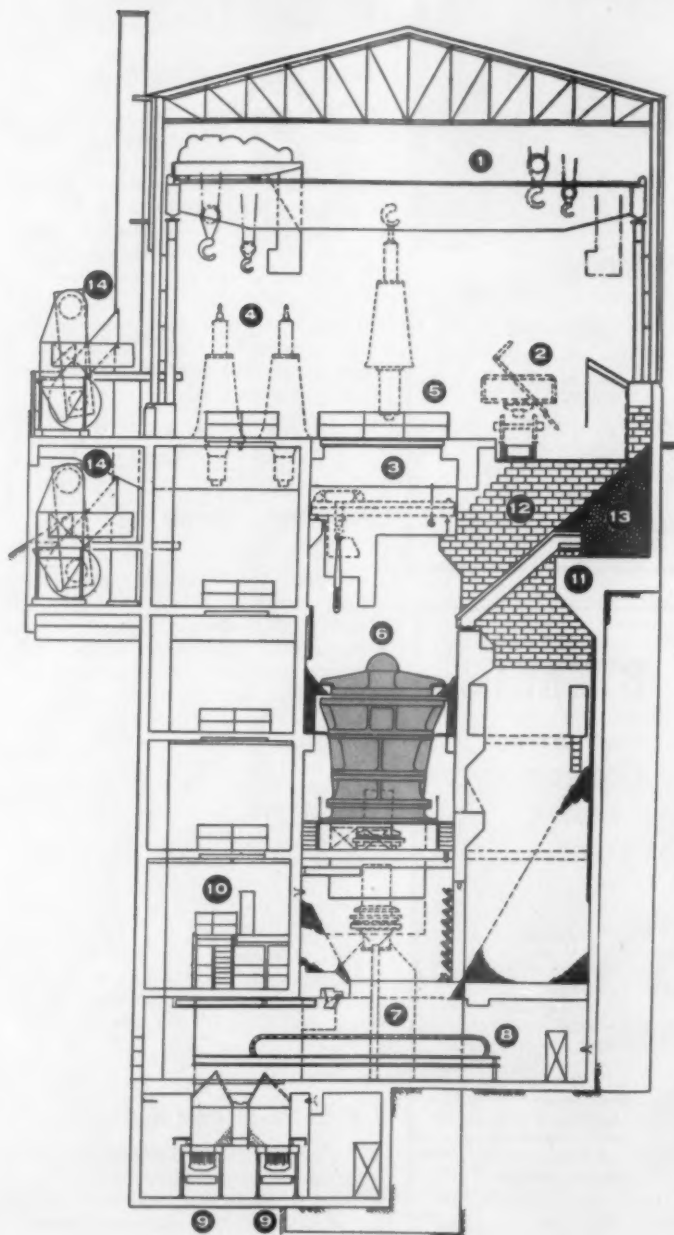
Bemis Bro. acquires Air-Formed Products

ACQUISITION of a controlling interest in Air-Formed Products Corp., a manufacturer of blow-molded plastics, by Bemis Bro. Bag Co. was announced today by F. G. Bemis, chairman. Air-Formed Products, with headquarters in Nashua, N. H., produces blow-molded plastics for industrial containers and shapes. This plastic, forming rigid or flexible containers with a high degree of resistance to acids and other chemical compounds, as well as to stress cracking, has opened new areas for packaging. The Bemis Co. is a manufacturer of bags and other forms of flexible packaging.

(Continued on page 156)

1,000,000

POUNDS OF TRAYLOR ENGINEERING!



TRAYLOR

world's largest manufacturer of 60" gyratory crushers designed and built this giant for installation in Peru.

The Southern Peru Copper Corporation called on Traylor-made ECONOMY, EFFICIENCY, AND CAPACITY to handle the tremendous crushing workload at its new plant in Toquepala, Peru.

Drawing shows Traylor 60" gyratory crusher operation:

1. 100-ton crane with 25-ton auxiliary hook and operator's cab
2. 43-cu. yd. side-dump mine car
3. 20-ton crane with rock hook
4. Mantle storage
5. 18 x 22-ft. removable hatch
6. 60-in. Traylor gyratory primary crusher
7. Hydraulic hoist, 14-ft. lift, 25-ton capacity
8. Two 72-in. pan feeders
9. Two 54-in. chain-belt conveyors
10. Electrical control panel
11. 8-in. grizzly
12. 2-in. plate liners
13. Dead-bed areas
14. Air filter dust removal unit

Other Traylor Crushers made for primary, secondary or fine reductions. Write today outlining your crushing requirements and let Traylor's engineers make recommendations . . . or ask for Bulletin No. 1126.

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TCA-9

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HERE WE GO! WAGON TRAIN

MORE TONS PER TRIP
A CONVENIENT WAY TO
UNLOAD — SIDE DELIVERY —
KEEP GOING. LEAVE
ROAD CLEAR FOR NEXT
WAGON TRAIN



DIFFERENTIAL COMPANY

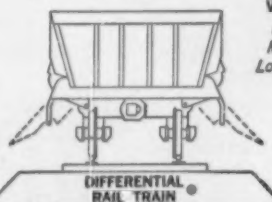
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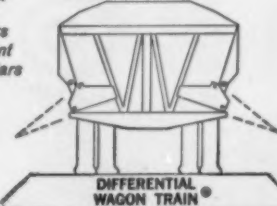
Railway Air Dump Cars
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HAYWARD CLAMSHELL BUCKETS

**WORK LONGER,
WORK FASTER,
WEAR LESS!**

Designed with rugged,
one-piece alloy shells...
wide type, cast manganese
steel cutting edges...
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capacity loads and easy
discharge... manganese
bushings... diagonal
truss brace to keep
shell in line... has no
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Builders of Better Buckets Since 1888

Enter 1471 on Reader Card

MANUFACTURERS NEWS

(Continued from page 154)



Huge clam-shell by Yaun

FABRICATION OF A CLAM-SHELL, claimed to be the largest ever produced in the South, has been completed by Yaun Mfg. Co., Inc., Baton Rouge, La. It was produced for Mall, Inc., an offshore marine construction company. The clam-shell, weighing some 24,000 lb., is a 15-yd., round-nose type which can handle 18 yd. of material. It will be used as part of a drag-line and clam-shell system (photo) on a new barge, soon to be placed into service by the Mall Co.

Owatonna Tool Co. Reorganizes sales dept.

J. A. MULLENMASTER, vice president, director of sales, Owatonna Tool Co., Owatonna, Minn., has announced the reorganization of the OTC sales department into three distinct divisions: precision hydraulics, tools and equipment, and export. As part of the reorganization plan, Robert Allyn, previously distributor sales manager, has been promoted to the position of assistant to the vice president, director of sales. The precision hydraulics division is headed by J. E. Braas, formerly OTC industrial sales manager. The export division is under the management of Carlos V. del Mercado who has managed the company's export business for the past five years. In the tools and equipment division, the sales manager's position has not yet been filled.

Creative design service

A NEW CREATIVE DESIGN service offered to customers by West Virginia Pulp & Paper Co. makes it possible for multiwall bag users to achieve advertising impact for their products. The creative service offered by the multiwall bag div. provides an original approach to printing, color and layout, which is translated into a series of preliminary and finished designs. The service will create new designs or revise and modernize existing designs.

Cummins Engine Co. plans new addition

CUMMINS ENGINE Co., Inc., Columbus, Ind., announced plans for a \$1.7-million addition to its manufacturing facilities. Construction on the building will house all engine assembly functions, according to E. D. Tull, president. Completion is scheduled for August, 1961. The new facilities will provide 101,600 sq. ft. of additional floor space, increasing the total building area at the Columbus site to over 1,000,000 sq. ft. It will also provide machining facilities for cylinder block and cylinder heads.

Primary construction material will be concrete block over a structural steel frame. The building will be the company's second largest single structure at present.

Moline Malleable Iron holds sales conference



MOLINE MALLEABLE IRON Co. held its national sales conference (photo) in St. Charles, Ill. Representatives and distributors of Moline conveying, elevating and power transmission chains were flown in from all sections of the U. S. and Canada for a three-day sales meeting at the factory. Highlight of the conference was a tour of the enlarged plant which boasts a new \$500,000 building annex to house new chain assembly and heat-treating facilities.

WEMCO's movie on jigging

WESTERN MACHINERY Co., San Francisco, Calif., has produced a 16mm. color film on jigging. The film, entitled "It's The Extra Jiggle That Counts", describes the history and theory of jigging, one of the oldest forms of mineral beneficiation, as well as the design improvements embodied in the modern jig. Detailed scenes show modern-day jig treatment of iron ore. The jigging of concrete aggregates at several mid-west sand and gravel plants is also shown. This is the third film showing the design and operation of the company's products.

END



...without help, using a POWER-CURVE Loader

Bag loading costs of eight cents a ton are not uncommon in plants using Power-Curve equipment. One man loads and stacks direct from the packer with no need to lift a single bag. Loads can be palletized or stacked in any pattern, also put into warehouse storage.

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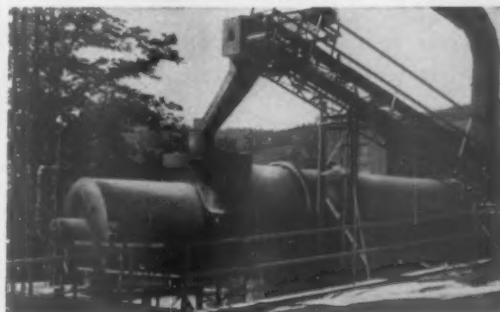
Literature and engineering details sent on request.

POWER-CURVE
CONVEYOR COMPANY
2185 SOUTH JASON ST., DENVER 23, COLORADO

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KILNS • COOLERS • DRYERS

researched, designed, and built specifically for your needs
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Staggered cup-shaped lifters assure even distribution of product. RESULT: greatly increased capacity and efficiency.

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BRILL BUYS

ROTARY KILNS, DRYERS, COOLERS

- 1—Smidth 8'6" x 175' Rotary Kiln 3/4" shell.
- 1—Allis Chalmers 9' x 130' Rotary Kiln 3/4" shell.
- 1—Allis Chalmers 7' x 120' Rotary Kiln, 3/4" welded shell.
- 2—Allis Chalmers 7'6" x 7' x 125' Rotary Kilns.
- 1—Allis Chalmers 4' x 40' Rotary Kiln 3/4" shell.
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- 1—Vulcan 8' x 80' Rotary Dryer 1/2" shell.
- 2—RotoLouvre Dryers 6'4" x 24'.
- 1—Vulcan 6'5" x 60' Rotary Dryer 3/4" shell.
- 1—Vulcan 6' x 54' Rotary Dryer 3/4" shell.
- 1—Rennenburg 6' x 50' Rotary Dryer 3/4" shell.
- 2—Barnett 6' x 40' Rotary Dryers 1/2" shell.
- 3—Davis 6' x 25' Rotary Dryers 1/2" shell.
- 1—Ruggles Cole 5' x 30' Rotary Dryer 3/4" shell.
- 1—Allis Chalmers 4' x 30' Rotary Dryer 3/4" shell.
- 1—3' x 35' Rotary Dryer 3/4" shell.
- 1—34" x 30' Rotary Dryer 3/4" shell.

MILLS - CRUSHERS - PULVERIZERS

- 1—Traylor 42" Gyratory Crusher 250 HP motor.
- 1—Traylor Compab Mill, 7' x 27', 600 H.P.
- 2—Harcings 10' x 48", 8' x 36" Conical Ball Mills, motor driven.
- 1—Traylor 5'4" x 24" double roll crusher.
- 1—Traylor 42" x 18" double roll crusher.
- 1—Allis Chalmers 36" x 16" double roll crusher.
- 4—Strategic 30" x 16" double roll crushers.
- 3—Traylor 30" x 14" double roll crushers.
- 1—Penn Hammermill, size 5060, Hopper opening 60" x 24".
- 1—Penn Super-Ther Hammermill, size SXT-13, 250 H.P.
- 1—Kennedy Van Soun 4'6" x 9' Ball Mill.

AIR SEPARATORS - SCREENS

- 1—16" dia. Raymond Whizzer separator with 50 H.P. motor.
- 1—14" dia. Raymond Whizzer separator with 60 H.P. motor.
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- 10—Mod. PH95A International Payhousers w/30 cu. yd. Mod. PW20 Athey Bottom Dump Trailers. Tractors have new 425 H.P. G.M. Engines. 30,500.00 ea.
- 10—Mod. DW20 Cat Tractors w/30 cu. yd. Mod. PW20 Athey Bottom Dump Trailers, 67C Series. 27,000.00 ea.
- 12—30 cu. yd. Mod. MX30 Southwest Bottom Dump Trailers. 5,000.00 ea.
- 10—Mod. DW20 Cat Tractors w/456P Cat Modified Scrapers, 67C Series. 27,000.00 ea.
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- 1—Bonnet steel rotary cooler, 8' x 50', complete with drive and motor, 3/4" material.
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New, clean, "F", "D", "H", "200", "400", "600", "700" and "1000" thread specifications.

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| American ear puller | Bay City 3/4 yd. #25 hoe | Austin 8 ton roller KT-142 |
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| Unit 614 3/4 yd. backhoe | Bay City #25 gas. dragline | Amer. 50B 3 drum hoist w/slewer |
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1—Traylor 11' x 155' rotary kiln, 2 tires, welded 1/2" shell, complete with drive and motor

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1—Rotary dryer 7' x 60', 2 tires, 1/2" shell, complete with drive, motor, blowers and all auxiliary equipment

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1—Rotary dryer 6' x 56', 2 tires, 1/2" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 50', 2 tires, 1/2" shell, complete with drive, motor, blowers and

all auxiliary equipment

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1—Steel ball mill 7 1/2' x 7', complete with full charge of steel balls and drive

1—General American 7' x 40' rotary dryer, 3/8" welded shell, complete

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500' -9" Screw Conveyor complete with ends,
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46" Stedman 2 Cage
4 Row Disintegrator
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CRUSHERS, GYRATORY: 48" Primary and 20" Secondary, with motors and drive. One Tel-smith 16-B.

CRUSHERS, REDUCTION: Two Nordberg (Symons) 4 ft., Short Head and Standard. One 5 1/2 ft. standard. One 7 ft. Short Head. With or without motors.

FEEDERS: Two Jeffrey Vibrator 4DS, size 24 x 96".

DRYERS: One 5' x 25 ft. and one 5' x 34 ft.

KILNS: One 8 ft. x 118 ft. One Rotary 4 1/2 ft. dia. x 40 ft. with rotocone and 7 1/2 H.P. motor, 3 H.P. motor and speed reducer, classifier, kiln burner, etc.

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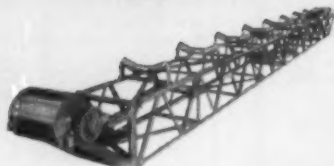
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8" Jr. I Beam Frame Conveyor

Truss Frame Conveyors



- Built Like A Bridge
- For High Tonnages
- Clear Spans To 50 Ft.
- Any Length - Any Belt Width

Complete Pre-Fab sections of 8" Jones and Laughlin Jr. I Beam Frame Conveyor, quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams, with .20% Copper have as much as four times the resistance to corrosion as non-copper metals. They are braced with structural angle, welded to frame for maximum rigidity and compactness. Conveyors are equipped with 5" roll diam. idlers and return rolls. 28" diam. head pulley and 16" diam. tail pulley mounted on 2 1/4" or 2 1/2" diam. shaft. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply 28-on, duck, 1/4" top rubber cover x 1/2" bottom cover and is fresh stock guaranteed to meet or exceed listed specifications.

8" JR. I-BEAM CONVEYORS WRITE FOR BULLETIN #1185

Belt Width	Conveyor Length	Sale Price	Add or Deduct Per Foot
14"	25'	\$ 766	\$16.62
16"	20'	700	
16"	45'	1,128	\$17.10
18"	25'	830	
18"	45'	1,190	
18"	70'	1,641	\$18.03
18"	85'	1,912	
18"	100'	2,182	
18"	130'	2,723	
18"	200'	3,983	
20"	25'	871	
20"	60'	1,546	
20"	75'	1,836	\$19.30
20"	90'	2,125	
24"	25'	922	
24"	45'	1,335	
24"	70'	1,852	
24"	100'	2,473	\$20.68
24"	120'	2,886	
24"	150'	3,507	
24"	200'	4,540	
30"	50'	1,591	
30"	70'	2,054	\$23.17
30"	90'	2,518	
30"	100'	2,749	
36"	25'	1,105	
36"	45'	1,623	\$25.91
36"	60'	2,012	
36"	100'	3,048	

TRUSS FRAME CONVEYORS WRITE FOR BULLETIN #1189

Sale Price	Add or Deduct Per Five Feet
\$ 965	\$109
875	
1,434	\$112
1,104	
1,573	
2,150	\$117.20
2,510	
2,862	
3,565	
5,206	
1,150	
2,017	
2,388	\$123.81
2,759	
1,201	
1,723	
2,377	
3,160	\$130.66
3,683	
4,467	
5,773	
2,018	
2,594	
3,171	\$144.18
4,512	
1,866	
2,024	
2,497	\$157.64
3,758	

BONDED® HEAVY DUTY MOBILE CONVEYORS

- FAST ECONOMICAL HANDLING OF BULK MATERIAL
- AVAILABLE WITH SCREEN AND FEEDER
- RUGGED 30" DEEP TRUSS FRAME
- HIGH TONNAGE AT LOW COST
- EQUIPPED WITH TOW HITCH



The economical solution to the need for a heavy duty conveyor that can be readily moved from one job-site to another. Available with mast or mastless type under-carriage and hydraulic powered mechanism. All standard conveyor accessories can be used. Lengths to 60 feet and belt widths through 30 inches. Priced from \$2365.00.

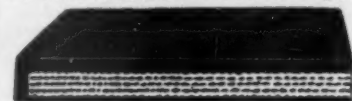
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WE PAY FREIGHT ON 200 POUNDS OR OVER PLUS AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.

All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

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MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty. 28 on, duck. 1/4" top x 1/2" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	U. S. Made Per Foot
14"	4	\$2.94
16"	4	3.09
18"	4	3.42
20"	4	3.95
24"	4	4.43
30"	4	5.42
36"	4	6.43

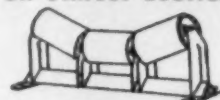
MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty, 28 on, duck with 1/4" top x 1/2" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	U.S. Made Per Foot	Special Imported Belt Per Foot
16"	4	\$3.60	\$3.23
18"	4	3.98	3.59
20"	4	4.54	4.15
24"	4	5.14	4.67
26"	4	6.31	5.75
24"	5	6.91	5.41

WRITE US FOR YOUR ELEVATOR BELT AND CHUTE LINING REQUIREMENTS

ELEVATOR BELT is of heavy duck carcass with smooth tough rubber or friction surface on one or both sides. Can be furnished with or without bucket punched holes and cemented. Write for full information and prices. CHUTE LINING is of high-tensile, abrasion-resisting quality. Recommended for Chute and Launder Lining, Conveyor Belt Scrapers, Conveyor Skirt Boards, Die-Press or Bumper Stock, Hoppers, Bins and other metal surfaces exposed to the action of abrasion materials.

BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY



3-roll, 5" diameter Troughing Idlers for:			
14" belt	\$19.75	24" belt	\$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	23.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:			
14" belt	\$ 8.50	24" belt	\$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. WRITE FOR BULLETIN #1188.

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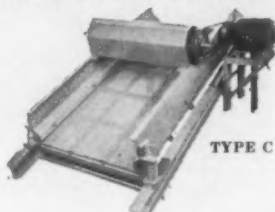
Mfrs. of Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators COLUMBUS 7, OHIO



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BONDED® SPECIAL SERVICE AND HEAVY DUTY VIBRATING SCREENS



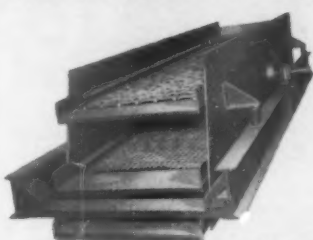
TYPE C

WRITE FOR BULLETIN #1224

For scalping middle-range pieces and accurate sizing of fines where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tippie, building or platform.

Priced from\$487

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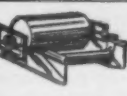
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- 1—Stiff Leg Derrick with approximately 30 ft. boom, 25 ft. mast, lifting capacity 5000 lb.
- 1—4 Drum Cable Hoist with 230 volt DC Motor, lifting capacity of 5000 lb.

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WANTED

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36" x 166' Belt Conveyor
36" x 240' Belt Conveyor
24" x 65' Belt Conveyor
24" x 45' Belt Conveyor
Open Tank 12' dia.—14' high
Single Deck Scalping Screen 4' x 8'
Two 36" x 6' Vibratory Feeders

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Two Good used Belt Conveyors 30" wide,
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NOTES FROM THE PUBLISHER

January, 1961

Dear Reader:

As I stated in the December issue, the preliminary production forecast for 1961 indicates a record year for nonmetallic minerals.

We still feel that business in our fields will be good—better than the general economic news might indicate. However, for us really to have a star year of record production, we'll need to pull out all the stops in our selling efforts. It also will be a good idea for all of us to start talking and thinking positively—let's forget our lackadaisical attitude toward the future.

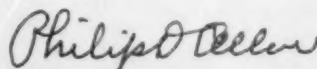
Let's buckle down and promote our products as they never have been promoted before. The burden of proof is squarely on our respective shoulders.

ROCK PRODUCTS editors will continue to travel this whole wide country in search of material to benefit you. They will write informative plant and general articles. All editorial material will show you how to produce and manage better, and more economically—the advertising will show "what with."

If you have any suggestions on our editorial presentation, we should be delighted to hear from you. This is your magazine, designed to help you.

I hope you enjoy and profit from reading this issue of ROCK PRODUCTS and those to follow.

Sincerely,



Philip D. Allen
Publisher

"WE CHOSE TIMKEN® CARBIDE INSERT BITS FOR CONSISTENT PERFORMANCE"

Special report from
Channel Constructors

•
**LOCATION: Niagara
Falls Power Project**

•
**OPERATING
CONDITIONS:
Rock-Lockport
Dolomite**

Reports from the Niagara Power Project prove again that Timken® carbide insert bits give the most economical service. Timken bits were used in drilling the 500 ft. wide, 100 ft. deep cut shown at the right. Channel Constructors chose Timken carbide insert bits because of their consistent performance on the rock drilling phase of this project. Users of Timken bits everywhere report such savings — more feet-per-bit, longer bit life, fewer lost holes.



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Your most economical bit for hard, abrasive ground is the Timken carbide insert bit. In softer ground, use the low-cost Timken all-steel multi-use bit. Because both bits are interchangeable in the same thread series you can switch bits when the ground changes. Dozens of different Timken bits fit the same drill steel. Both types are made from Timken electric furnace fine alloy steel, have special shoulder unions that protect threads against drilling impact. Let us help you select the Timken bit that will do the most economical job for you. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

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